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### The Burlington Rules for Special Trains.

I have read with interest in the *Railroad Gazette* of yesterday your notes on the special train which ran from Chicago to Burlington over the C., B. & Q. on Feb. 15, together with the rules under which a train is run without the issue of telegraphic orders. Are there not several questions in connection with these rules which need to be more specifically answered? The pudding act does not always settle a troublesome point. It is an unfortunate fact that puddings often taste well for a long series of years, while in fact they have in them all the time the elements of disease, if not of death. Many a railroad rule has worked well, or at least well enough so that its sponsors and friends would not give it up, for more than seven years, and yet has at last been condemned as unsafe.

As you say, the Burlington road lies through a prairie country, and most of the time trains can run there with as little need of signals or train orders as there would be in running boats on a canal, or for horses and carriages on a broad street with nobody going faster than six miles an hour. But how about dark nights and blinding snowstorms and foggy mornings? Fog makes as much trouble on straight roads as on crooked, and snowstorms are as frequent on the Burlington, I suppose, as on the average road in the Northern States.

The Burlington has presumably adopted the Standard Code; and the rules in that code, or most of them, are supposed to be applicable regardless of weather. They require the same thorough precautions against collisions, especially at yards and on approaching yards, in foul weather as in fair.

What does a Burlington special train do on approaching a station? Is the speed brought under control before the train reaches the mile board or other outer limit? If it is, time is consumed and record-beating is out of the question. If it is not, a regular train will be struck some day. Do the latter always flag, strictly according to the rules? If they do, they waste a good deal of time and energy. How can a special train run around and go ahead of another train unless it first comes up near enough to the latter to indicate what is wanted?

If the Burlington practice is simply a scheme to abolish formal train orders, with their repetitions and signatures, and use in their place unrepeatable messages, your correspondent ought to have made a statement to that effect. To the backwoodsman who is used to hills and rivers and other things which make curves necessary, the management of trains on the perfectly level prairies of Illinois is somewhat of a puzzle. We do not deny that the men who have had long experience there are very successful in solving the puzzle, but we are interested to know how they do it.

F. R. C.

Purdue University,  
LAFAYETTE, Ind., March 8.

The editorial upon "A Possible Relation of the Technical School to the Engineering Associations" in your issue of Feb. 19 brings up a matter which is destined, I believe, to receive very careful attention during the next few years. Within this period American railroads will need to determine by what process they will obtain such experimental facts as are required for their continued advancement. There is a constant demand for facts concerning the composition, durability or performance of the various mechanical details which go to

The problem admits of at least two solutions: First, there could be an association of railroads for the purpose of establishing a laboratory having its permanent corps of workers and sufficiently extensive to deal with all the different phases of railroad work; or, secondly, such an association could appoint committees to take the general direction of selected work which may be executed for them by existing laboratories, as, for example, those of certain schools, as suggested by the *Railroad Gazette*.

By the first plan both the initial investment and running expense would be large, but in case a considerable number of roads united, the cost per mile of track would be insignificant when compared with the possible value of benefits derived.

The second plan has in one instance, at least, received the approval of the Master Mechanics' Association and several of the steps necessary to its completion were taken; but in the case referred to, the plan failed in the last stage. It is in reality nothing more than an extension of that now in use, and it has some advantages which the first plan does not possess. It provides that committees of the railroad associations, such as already exist, be given access to the existing laboratories of certain technical schools. It makes available for the use of the railroads a portion of the instructional force and much of the equipment of such laboratories. It would secure to the railroads the assistance of the expert directors who would bring to the work an unprejudiced judgment unaffected by previous practical successes or failures. Such persons when aided by the suggestions of a committee of practical men should give the largest possible return for any investment that might be made.

The attempt of the Master Mechanics' Association to apply this plan was in connection with locomotive testing. Several years ago, at the solicitation of certain members of this body, Purdue University, through its President, offered the use of its experimental locomotive plant to the Association, all without cost except for running expenses. At the convention of 1893 a committee was appointed to conduct work on this plant, and the convention requested the Executive Committee to raise a fund of \$5,000 to carry it on. At Saratoga the following year the Secretary reported the failure of the Executive Committee to secure the sum needed, and upon the recommendation of a special committee appointed to suggest action, two other committees were appointed namely, a working committee and a finance committee. The first-named committee, of which Mr. William Forsyth was Chairman, was charged with the duty of outlining such test as could well be undertaken in a single year; of making an estimate of their cost, and after the money had been made available, of proceeding with the conduct of the work. This committee planned an elaborate series of tests to determine the comparative efficiency of simple and compound locomotives, and submitted their estimate to the Finance Committee, of which the late Mr. Lauder was chairman. The Finance Committee made a heroic effort to raise the amount required, first by subscription from individual railroads, and later by appropriation from the American Railway Association, but their labor was not rewarded by success. The working committee therefore could not proceed, and nothing was done. The fact that their plan received the attention of a busy convention for two years in succession, and that it was uniformly approved, is an indication that as the demand for results become more urgent, and the roads interested more thoroughly aroused, it may be carried to a successful issue.

**The New Steel-Tired Wheel Company.**

For a number of weeks we have been aware of negotiations that were in progress to bring about a combination of makers of steel-tired wheels. This combination has now been effected, the only important companies which stay outside being the Standard Steel Works and the Taylor Iron & Steel Co. The new organization is not a trust; it is an outright purchase of the plant and material of the various companies by a new corporation, the Steel-Tired Wheel Company. This company was incorporated in New Jersey Jan. 27, with an authorized capital of \$4,000,000, one half of this being preferred stock. The officers of the new company are: President, J. E. French, formerly President of the Paige Car Wheel Co.; First Vice-President, W. W. Snow, of the Ramapo Wheel & Foundry Co.; Second Vice-President, C. H. Antes, formerly President of the Allen Paper Car-wheel Co., General Manager, W. H. Silverthorn, formerly Vice-President of the Paige Co.; Treasurer, J. C. Beach, formerly Vice-President of the Allen Co.; Secretary, W. W. Turlay, formerly President of the National Car Wheel Co. The Directors of the new company are the officers named above, also H. M. Boies, formerly President of the Boies Steel Wheel Co., and W. M. Barnum, of the firm of Simpson, Thacher & Barnum, lawyers (son of the late Gen. W. H. Barnum).

The wheel works purchased will all continue to run under the new organization.

The companies which have been bought out are the Allen Paper Car Wheel Company, Boies Steel Wheel

Company, McKee, Fuller & Co., the National Car Wheel Co., the Paige Car Wheel Co., the Ramapo Wheel & Foundry Co., so far as the steel wheel business goes, and the Washburn Car Wheel Co. The Krupp wheel business, as represented by Messrs. Thos. Prosser & Sons, will also be controlled.

The expectation is that the new organization will be able to reduce the price to the consumer of steel-tired wheels, and at the same time make more money, by saving in the expenses of putting the wheels on the market. It is not probable that much can be saved at present, in manufacture, but a very large part of the cost of the wheel to the consumer is the cost of selling, which can be greatly reduced under the new arrangement.

The offices of the Steel-Tired Wheel Co. are in the Boreel Building, 115 Broadway, New York.

*Light Railroads.*—A fortnight ago I was present at the first enquiry held by the Light Railway Commissioners under the new act. The line was the Basingstoke & Alton Railway, 12 miles in length, and it is promoted by the London & South Western. It starts from an existing line and ends in a junction; consequently no expenditure will be incurred for terminal accommodation. The railway passes through a very sparsely populated agricultural district, and nowhere does it interfere with valuable property. Yet the expense is estimated, excluding rolling stock, if I understand rightly, at £35,000, or roughly £5,500 per mile. The route crosses a considerable range of hills, and consequently some fairly heavy earthwork has been found inevitable, even after admitting gradients as severe as 1 in 50. It is proposed to lay rails of 60 lbs. to the yard, and to have three intermediate stations of the simplest possible character. The questions of signaling, continuous brakes, interlocking, etc., have not yet been raised. But it is intended that the line shall be constructed on land of its own and fenced in throughout.

The only serious question which arose at the inquiry was with reference to interference with the public roads. There are 18 of these, and eight are crossed by bridges. Of the remainder, nine are very unimportant by-roads. The tenth is a high road, but said to be practically disused. The proposal to cross the nine by-roads on the level was allowed to pass unchallenged; but strong opposition was offered by the local authorities in the case of the disused high road. It was vehemently urged, not only that the railway and its gates would obstruct the highway, but that for trains to run in the manner proposed down the bottom of the valley close alongside the road for some distance was dangerous, that horses would take fright and accidents result, and the upshot of the discussion is to show that the public will need a good deal of education before railways on a continental or American scale of cost can become possible in this country. A less serious interference with existing roads than that proposed by the Basingstoke & Alton line it is impossible to imagine that any light railway can cause. Further, the inhabitants of the district are quite unanimous in desiring to see the line made, and yet they are almost, if not quite, prepared to go the length of insisting on conditions which would make it practically impossible of construction even by an existing railway company. And that no one except an existing company could possibly afford to make it at all was admitted at the outset.

*Railroad Clubs.*—I see that Herr Sigismund Weill has been publishing in an Austrian railway journal a very full account of the clubs, institutions and unions formed by and for railway men in the different countries of the world. He speaks of the number of such associations existing in England. But he ignores altogether what, to an Englishman, is perhaps the most remarkable feature in the case. We have innumerable railway associations, but of organizations for the advancement of railway technical knowledge Herr Weill does not mention one single instance. Nor have we a single English journal devoted to the advancement of technical railway knowledge. Supposing, for example, an English official were to be sent abroad—which I am bound to say English officials hardly ever are—to study the methods of other countries, and on his return were to write a paper dealing with, say, methods of marshalling and shunting goods trucks in foreign countries, he would find no association before whom such a paper could naturally be read and no journal in whose pages it would naturally appear. I am glad to say that at the present moment there seems a good prospect of part of the want being supplied. The nucleus of a railway library is now being formed; lectures on railway economics were given in London last winter for the first time, and this year they have been repeated before a largely increased audience. Within the last few weeks one of the greatest companies has taken the matter seriously in hand, and there is every hope that before next autumn a scheme for systematic and co-ordinated courses of railway study will be brought into operation.

Simultaneously, another closely related movement has been pressed forward. Hitherto, we have had nothing in the nature of a railway museum. In the national museum at South Kensington there are, it is true, a few very famous old engines, foremost among them "The Rocket," but the collection is wholly haphazard and incomplete, and no attempt has apparently been made of recent years to extend it. Constantly we have heard of batches of old drawings being destroyed, and of historical old engines consigned to the scrap heap. Fortu-

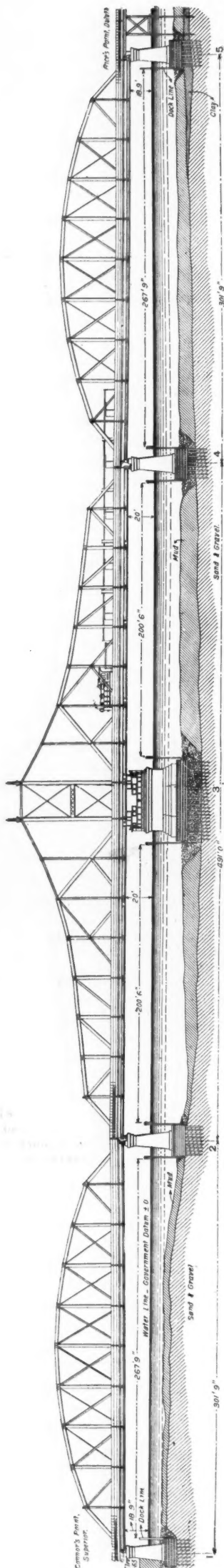


Fig. 2.—General Elevation of the Duluth-Superior Bridge.

PENNSYLVANIA STEEL CO., Contractor for Superstructure.

Mr. ALEXANDER MCGAW, Contractor for Substructure.

Mr. ALFRED P. BOLLER, Chief Engineer.

nately, enquiries from other countries, more especially on behalf of the Chicago Museum, have awakened people here to the fact that, unless something was speedily done, Englishmen would need to cross the Atlantic to study the origin of their own railways. Last autumn a committee was formed to promote the establishment of a railway museum, and it has induced the government to take the matter up and to extend and systematize the South Kensington collection. Within the last few days the Great Western have presented to it the "North Star," the earliest broad-gauge engine, and other gifts are announced to follow directly. Moreover, it is not only within the museum itself that steps are being taken to preserve and make accessible to the public our railway antiquities. The North Eastern are bringing under cover at Newcastle station one of their earliest engines which for years past has stood outside exposed to all the winds of heaven, while the South Eastern is to set up at Charing Cross the "Invicta," which George Stephenson's firm built for the Whitstable & Canterbury Railway as long ago as 1830.

**A New Through Service.**—The South Eastern is to run next summer an afternoon service between London and Paris via Folkestone and Boulogne. Such a service, but traveling via Dover and Calais, was started in 1889 and lasted for about five years. But being confined to first-class passengers at exorbitant fares it did not pay and had to be discontinued. The new service is to be available for passengers of all classes and will be a profitable undertaking.

In connection with it an announcement has just been made, likely, I think, to mark a new departure. The great companies connecting London with the north have hitherto agreed upon a policy of "hands off" as to the railways from London to the Channel ports. No train other than specials and excursions has ever, that I am aware of, been run through London. Now, however, it is announced that, in connection with the new afternoon service to Paris, the Great Western will run a through service from the north to Folkestone. This service will not touch London at all, the exchange between the two companies being effected at Reading. But the result must almost inevitably be that the other northern companies, whose connection to the south can only be formed through London itself, will make a counter move.

**Thousand-Mile Tickets.**—The North Eastern has published figures as to the result of its experiment with 1,000-mile tickets. These are first class only and their price is five guineas, practically  $1\frac{1}{4}$ d. per mile. The issue commenced on the first of July last. During the six months ensuing, upward of 2,000 were issued, yielding an income of about £10,500, or over 12 per cent. of the total first-class receipts. Seeing that the average first-class receipts for the second halves of the ten previous years have been about £79,000, that during all those years the ups and downs have practically balanced themselves, and further, that no previous year has shown an advance of as much as £4,500 on its predecessor, it seems fairly safe to say that the increase of over £6,000 for 1896 over 1895, coming as it did on the top of an increase of £3,000 for 1895 over 1894, represents in the main new first-class traffic and only in a small degree the substitution of 1,000-mile for ordinary first-class tickets.

W. M. ACWORTH.

#### The Duluth-Superior Bridge.

The increase of traffic at the head of Lake Superior, with the resulting development of the cities of Duluth and West Superior, on either side of a harbor unmatched on the Lakes, has given rise to an important bridge enterprise, now rapidly approaching completion. Rail communication between the two cities has for several years been afforded by the Northern Pacific over a single-track pile structure about a mile long. This bridge is built on an indirect alignment, a curve being near its northern end, and has two iron draws for the passage of vessels. It is intended for steam cars only, and in the busy season is crowded to its full capacity.

The new structure occupies a position which is the shortest distance between the two cities, and to the contiguous harbor front, and hence is in the line of least resistance, so far as its own traffic is concerned. It crosses the harbor at its narrowest point, called "The Gate," and connects Rice's Point, Duluth, with Connor's Point, Superior, as shown by the map, Fig. 1. Here the harbor is about 1,100 ft. wide. The convergence of navigation at this point made extreme requirements for the bridge necessary, and the act of Congress authorizing its construction provided that the crossing should be made in not less than three spans, one of which

should be a draw affording at least 200 ft. clear water way between fenders; the clearance height above datum to be not less than 20 ft. The act further provided that any structure built should be for a double-track steam road and a double-track trolley road, with provision for teams and passengers. These requirements demanded a structure of unusual size, especially as the topographical situation necessitated that all traffic should be on the same horizontal plane.

The general plan, Fig. 2, shows the structure as being built. It consists of a draw-span 491 ft. long, flanked by

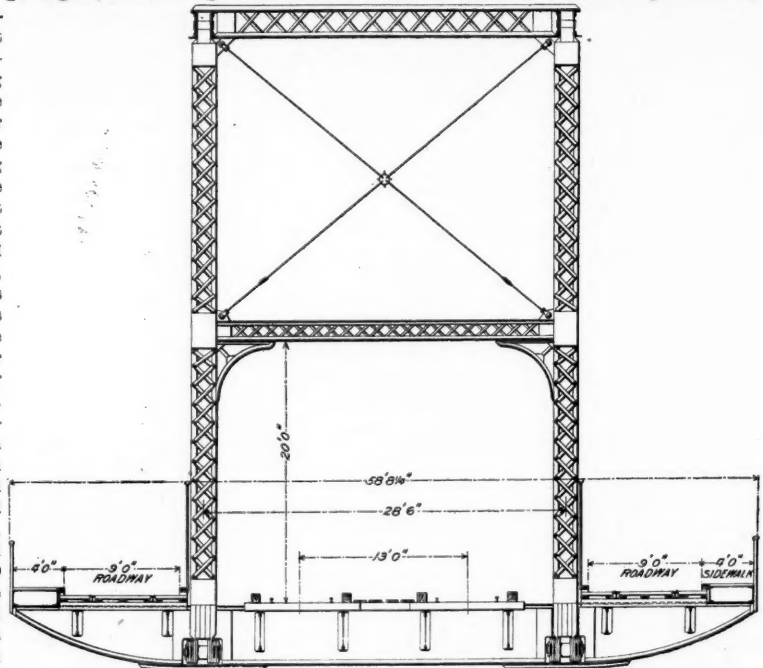


Fig. 3.—General Cross-Section of Duluth-Superior Bridge.

a span on either side of 302 ft., reminding one very much of the New London bridge in general elevation. (The New London bridge, by the same Chief Engineer, has a draw-span 503 ft. long between centers.) The total length from center to center of piers on dock lines is 1,094 ft. 6 in. The flooring system, to accommodate the various classes of traffic, is 58 ft. 8 1/4 in. in width, and is supported by two

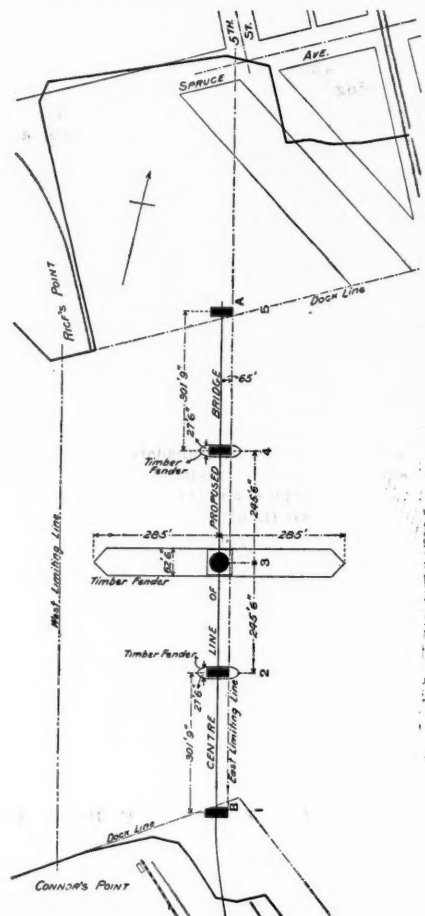


Fig. 4.—Plan Showing Location of Piers and Fenders of the Duluth Bridge.

trusses, 28 ft. 6 in. centers. The steam traffic is carried between the trusses and the trolley and highway service cantilevered out on either side, as shown in cross-section, Fig. 3. The structure is necessarily heavy, the draw weighing 1,800 tons, ranking among the largest in the country, being surpassed in weight by only two of the recent big draws over the Harlem River in New York City, the New York Central's new four-track



draw and the draw of the Seventh Avenue bridge at 155th street, each of which weighs about 2,500 tons. The width of clear waterway under each end of draw-span is 200 ft. 6 in., with a clear headroom of 20 ft. Under each rafting-span the width of clear waterway is 267 ft. 9 in., and the clear headroom under these is 18.9 ft. The wagon and street car traffic is confined to the same space on either side of the bridge.

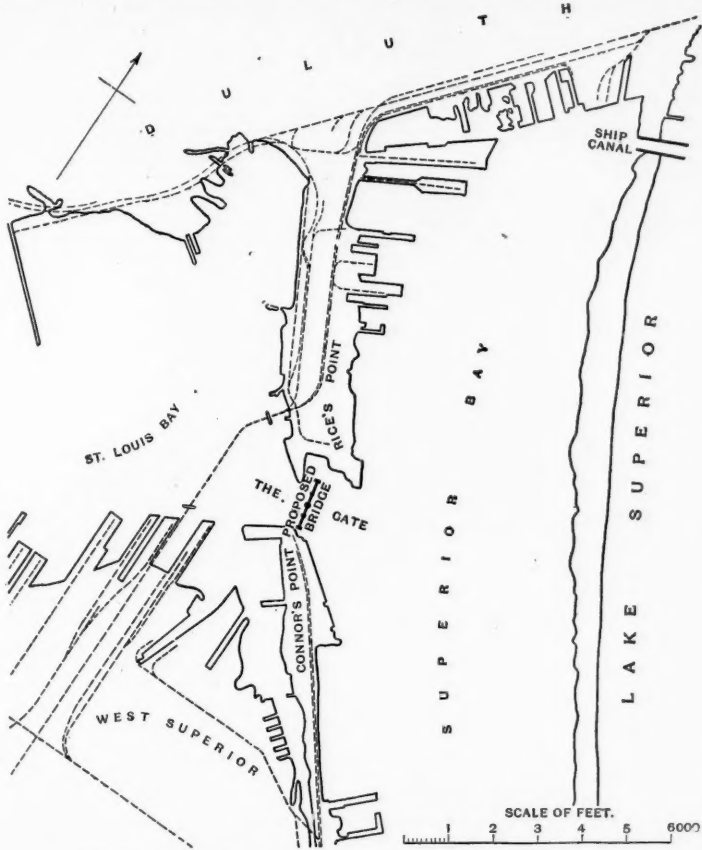


Fig. 1.—Map of the Harbors of Duluth, Minn., and Superior, Wis.

These roadways are each 9 ft. in the clear. Outside of these the 4-ft. sidewalks are placed.

The substructure, now completed, the general layout of which is shown in Fig. 4, consists of pile foundations cut off at 24 ft. below mean water (the improved government channel being minus 21). The piles are driven in a sand and gravel bottom, a water jet being necessary to put them down. By this method, under the blows of a 4,000-lb. hammer, a penetration of from 12 to 15 ft. was secured. An overlying deposit of harbor mud was dredged from the spaces occupied by the foundations to a depth of from 4 to 5 ft. below pile cut off. The voids between piles were filled after sawing with broken stone, while the spaces outside the piling were filled with one man stone riprap. The masonry, of Kettle River sandstone ashlar facing and Portland cement concrete backing, was laid in open caissons, having heavily timbered bottoms. The coping is 2 ft. thick and of St. Cloud granite. The rapidity with which the foundation work and masonry were built is worthy of note. Dredging was commenced the middle of July, and the whole five piers finished by Nov. 1, despite delays in getting grillage timber (hemlock from Canada) which made it Sept. 10 before the first stone was laid. For the center pier there are nearly 700 piles, and the grillage platform is 58 ft. sq. using 350,000 ft. of timber. The pier has 1,500 cu. yds. of masonry in it, and is so designed from the circular neck to the rectangular footings as to distribute the weight as uniformly as possible over the piles, which are driven 2½ ft. centers. The extreme loading on the piles will be about 11 tons.

The turn-table is entirely rim-bearing, with a diameter of 40 ft. All machinery will be driven by electricity furnished through a cable under the draw-channel, and led up, along the center pier, under the wheel-tread, and through the center hub, to two 50-H. P. motors, independently connected to each vertical shaft. The end lifts and rail-lifting apparatus will have an independent motor at each end of the bridge.

The structure was designed by Alfred P. Boller, of New York, Chief Engineer. The Pennsylvania Steel Co. is the contractor for the superstructure, and Alexander McGaw, of Philadelphia, built the substructure.

#### Engine Truck Swing Hangers.

The Master Mechanics' Committee on Truck Swing Hangers has sent out the following circular, answers to which should be sent to Mr. G. L. Potter, Superintendent Motive Power Penna. Lines, Fort Wayne, Ind.

In its report, made at the convention of the Master Mechanics' Association last year, which was published in the annual report on pp. 313-324, the Committee on Truck Swing Hangers called attention to the fact that at present it is not known how much lateral pressure must be exerted by swing trucks of locomotives on curves of different radii and at various speeds, to deflect the front ends of the engines radially and pull or push toward the centers of the curves. Attention was called in its report to the fact that "all the pressure in

excess of what is required will increase the flange wear of the truck wheels, and any insufficiency will add to the wear of the driving-wheel flanges. It is therefore important that more specific information should be obtained with reference to this point by some experimental investigation."

The committee then suggested "to the members of the association who have facilities for making such an investigation, that our ignorance of the subject offers the opportunity of supplying a valuable contribution to the existing knowledge of an important branch of locomotive engineering."

As the committee was continued, it will be expected to throw some light on this feature of the subject in its next report. The purpose of this circular is to call attention to this lack of definite information, and to suggest that there is, therefore, an opportunity of making a valuable contribution to engineering knowledge. The committee hopes that these two considerations may act as an incentive to some members of the association to make experimental investigations which will shed some light where there is now only darkness.

The committee is not prepared to indicate just how such experiments should be made, and thinks that more information would probably be obtained if each investigator would pursue his own methods in making experiments. The special information that is needed may be explained by referring to Fig. 1 accompanying the committee's report, on p. 315 of the "Annual Report" of the association. In running on a curve the center of an engine with a swing motion truck will occupy a position somewhat outside of the center line between the rails, while the truck itself will assume a position nearly normal to the curve, and the center of the truck will move in a line conforming very nearly to the center line between the rails. On a curve the center moves away from the center of the engine. In doing so, if lateral motion springs are used, these

must be compressed, and they will exert a corresponding lateral pressure on the center pin of the engine to move its front end radially toward the center of the curve. The information needed is the amount of pressure required to keep the flange of the front driving-wheel away from the outside rail. The amount of move-

quired to compress the lateral motion springs (if there are any) that distance, it could be known whether such pressure was sufficient or not to keep the flanges of the front driving wheels away from the outside rail. If swing hangers alone are used, if their length, angles and other dimensions, and the amount of the movement of the truck are ascertained, the lateral pressure exerted by the weight on the truck is also calculable for any given amount of movement. If the latter is sufficient to bring the flanges of the front driving wheels in contact with the outside rail, it will show that the lateral pressure exerted by the truck is insufficient to prevent the wear of that flange. If, on the other hand, there is very little lateral movement of the truck, it will indicate that the truck wheels are subjected to too much wear.

What seems to be needed is an adjustment of springs or hangers which will allow the truck to hang laterally in relation to the engine as far as is practicable without bringing the front driving-wheel flange in contact with the rail. What the committee desires to know is, how much lateral pressure a truck must exert on the front end of an engine to do this.

With the hope that you will be able to throw some light on this subject, the committee submits it to your consideration, with the request that the results of your investigations be forwarded to the Chairman of the Committee in time to prepare a report for the June meeting of the Association.

#### Locomotive Truck Brakes—American Brake Company.

When it was first proposed to equip the trucks of locomotives with air-brakes there was a feeling among railroad men that it was not safe and that the leading wheels would not readily pass around curves with the brakes set. Experience with suburban locomotives having the trucks under the tank equipped with air-brakes has shown that there is no greater danger from derailments due to the brakes when running backward than when in forward motion. With suburban engines the rear-truck brakes operate at a greater disadvantage, as there is less weight on the trucks and they are braked as much or more than the leading truck of an eight or ten-wheel locomotive, so if the truck brakes are dangerous it follows that derailments would be more likely to occur with suburban engines.

Where the speed is high and the locomotive heavy the weight on the engine truck represents no inconsiderable part of that available for braking purposes, and if used materially reduces the maximum braking power necessary on each coach for an ordinary service stop and permits of a shorter stop being made in an emergency.

We show in Figs. 1 and 2 a truck for an eight or ten-wheel locomotive equipped with the brake rigging of the American Brake Company. It will be seen from the engravings that the arrangement of the cylinder and levers is simple; all parts are contained within the truck, and an adjustment can be easily made as the shoes become worn. The use of a tire dressing brakeshoe on steel-tired truck wheels increases the mileage between tire turnings.

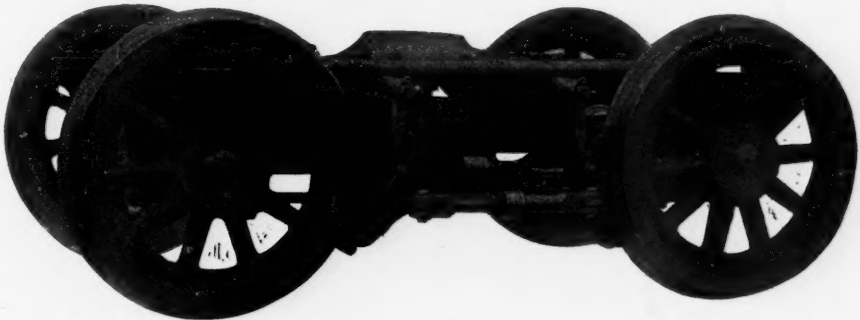


Fig. 1.—Brake Rigging for a Four-Wheel Locomotive Truck—American Brake Co

ment between the center of the engine and *g* of the truck, which would permit the flange to come in contact with the rail, is calculable for any given engine and curve. If it could be ascertained how much their centers move apart on curves of different radii, and the force re-

Up to the present time this company has equipped about 275 locomotives with truck brakes, and we are advised that there have been no accidents on account of derailments due to the brakes. Table I. gives the results

TABLE II.—TESTS OF LOCOMOTIVE TRUCK BRAKES.

Train conditions.	Length of stop in feet at speed of							
	30 Miles.		40 Miles.		50 Miles.		60 Miles.	
	Emerg.	Full service.	Emerg.	Full service.	Emerg.	Full service.	Emerg.	Full service.
3-car train								
With truck brake.....	268	360	517	657	881	1,079	1,381	1,653
Without truck brake.....	298	397	577	731	986	1,210	1,549	1,862
Gain—feet.....	30	37	60	74	105	131	160	209
“ per cent.....	10.1	9.3	10.4	10.1	10.6	10.8	10.8	11.3
4-car train								
With truck brake.....	264	386	508	688	865	1,118	1,355	1,697
Without truck brake.....	288	417	557	751	951	1,227	1,493	1,872
Gain—feet.....	24	31	49	63	86	109	138	175
“ per cent.....	8.3	7.4	8.8	8.3	9.0	8.8	9.2	9.3
5-car train								
With truck brake.....	261	411	502	721	853	1,158	1,336	1,742
Without truck brake.....	292	437	543	775	926	1,252	1,452	1,892
Gain—feet.....	21	26	41	54	73	94	116	150
“ per cent.....	7.4	6.0	7.5	7.0	7.9	7.5	8.0	8.0
6-car train								
With truck brake.....	259	436	497	754	845	1,198	1,322	1,790
Without truck brake.....	277	459	533	801	907	1,280	1,423	1,921
Gain—feet.....	18	23	36	47	62	82	101	131
“ per cent.....	6.5	5.0	6.7	5.8	6.8	6.4	7.1	6.8

Data : Weight of locomotive and tender, 180,000 lbs.  
Weight of each coach, 52,000 lbs.  
Calculated driver brake force, 75 per cent. of wt. carried to rails.  
Calculated truck brake force, 75 per cent. of wt. carried to rails.  
Calculated tender brake force, 90 per cent. of light wt. of tender.  
Calculated coach brake force, emergency, 50 per cent. of wt. of coach.  
Calculated coach brake force, full service, 75 per cent. of wt. of coach.  
Tests made on a level track

of tests made on the Old Colony Railroad with a locomotive equipped with truck brakes of the American Brake Company, to show their efficiency during emergency stops. The stops were made from two speeds, 45 and 60 miles per hour, both with and without the truck brakes. Tests were first made with the engine alone; cars were then added, one at a time, and the tests repeated until as many as six cars were added. By reference to Table I, it will be seen that the effect of the truck brakes gradually decreases as the train increases in weight. It should also be noted that in the tests where the engine was used alone the length of stop was shortened by the action of the truck brakes between 20 and 25 per cent.

The tests made on the Old Colony Railroad show only the action of the truck brakes during emergency applications. Table II. shows the results of tests made with a locomotive equipped with truck brakes of the American Brake Company's pattern, where both the emergency and full service stops were made. These tests were made on a level track stopping from speeds of 30, 40, 50 and 60 miles per hour, with trains of 3, 4, 5 and 6 cars; tests were made under practically the same conditions for both the service and emergency stops.

These results, as in Table I., show that the effect of the truck brakes gradually decreases as the weight of the train increases. The truck brakes have practically the same effect for all speeds, the other conditions remaining constant, and practically the same effect when used in either emergency or service applications.

The figures given in the accompanying tables are of use as showing the relative value of the truck brakes under various conditions of service. The diagram Fig. 3 shows graphically the results given in Table II., plotted with the length of stop and the speed as co-ordinates. From this diagram it is seen that the shortest emergency stops were made with the truck brakes attached

TABLE I.—ENGINE TRUCK BRAKE TESTS—OLD COLONY R. R.

Number of stop.	Speed per hour. Miles.	Number of cars.	Truck brake. In or out.	Length of run. Feet.	Average length. Feet.	Gain in feet.	Gain in per cent.
8	60	None.	In	1,609	1,657		
9	60	"	"	1,705	1,657		
10	60	"	Out	2,166	2,149	492	23
11	60	"	"	1,652			
4	45	"	In	990	1,005		
5	45	"	"	973	1,005		
6	45	"	Out	1,301	1,292	287	22
1	45	"	"	1,282	1,292		
2	45	One.	In	1,398	1,443		
16	60	"	Out	1,487	1,443		
17	60	"	"	1,721	1,705	282	15
18	60	"	In	1,680	1,680		
19	60	"	Out	821	889	855	
14	45	"	"	936	962	107	11
15	45	"	In	988	962		
12	45	"	Out	1,242	1,242		
13	45	Two.	In	1,381	1,381	139	10
25	60	"	Out	850	850		
26	45	"	In	940	940	90	10
29	45	"	Out	1,203	1,203		
34	60	Three.	In	1,314	1,314	111	8
32	60	"	Out	1,411	1,411		
49	60	Four.	In	1,452	1,452		
50	60	"	Out	1,593	1,543	111	7
47	60	"	"	1,493	1,543		
48	60	"	In	828	818		
43	45	"	Out	808	818		
44	45	"	"	836	836		
45	45	"	In	885	861	43	5
46	45	Five.	Out	705	705		
53	45	"	In	706	737	32	4
54	45	"	Out	706	737		
59	60	Six	In	1,180	1,217	34	3
61	60	"	Out	1,253	1,256		
62	60	"	"	1,256	1,256		
63	60	"	In	1,246	1,251		
57	45	"	Out	737	741		
58	45	"	"	744	741		
55	45	"	In	783	783		
56	45	"	Out	776	780	39	5

ing when a six-car train was used, and a shorter stop was made with a three-car train using the truck brakes than any of the trains with the truck brakes cut out. The shortest full service stop was made with a three-car train using the truck brake, the length of the stop increasing as cars were added.

#### Suburban Competition.

BY CHAS. J. BATES, M. AM. SOC. C. E.

This subject has become one of serious consideration to the managers of what I shall here call trunk lines. The question of electric traction, which the street-car men have solved for themselves, at least to a degree that has made it of great practical use, has become an important factor. When the street companies secured a motive power that enabled them to handle single cars at a speed and facility that horses could not give, they opened their eyes to an extension of their territory that has seriously injured the trunk line by cutting into the receipts of its best paying traffic.

As the advantages the trolley lines, in the matter of terminal facilities and right of way, have not been materially changed by the adoption of electric power, their gain must be looked for in the greater facility for handling their cars which locomotives could not give; otherwise they might have adopted the locomotive, without waiting for electricity, to bring suburban traffic within their reach.

It requires no argument or illustration, further than we have before us constantly, to prove the greater facility, both to the managers and public, in having every car independent of every other, so when travel is light no more expenditure of power per car is required than when travel is heavy. Each car is started without

reference to the number of people to be carried; if an unusual number demand transportation, an increased number of cars is easily provided, and each car is handled with as ready facility as if it were the only car on the line, and the public that pays, is accommodated as the individuals appear without their collecting in any considerable numbers.

Many points might be elaborated showing that it is this facility of handling the traffic that gives the electric line the advantage over the trunk line.

Competition, to succeed, requires our meeting our

equally incomprehensible how an engine propelled by one kind of gas is better than one using another kind of gas, in facilitating the handling of cars. The fundamental method must be changed.

The many changes of method that have transpired, since changing from stage coaches and horses to rail roads and steam drawn cars, are too well known to be considered here. When the electric street light was adopted there was no further use for the man who went from post to post to light the lamps; they are now turned on at the central station. With the old hand-

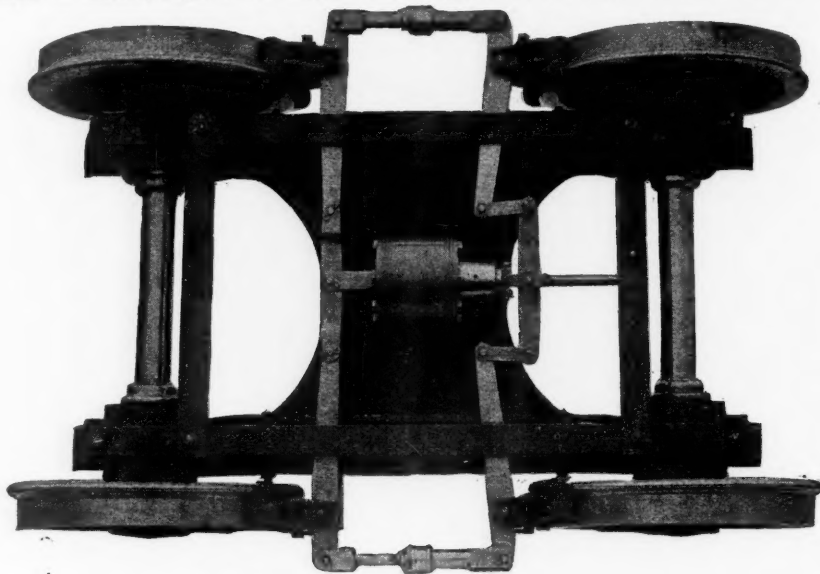


Fig. 2.—Inverted View of Four-Wheel Locomotive Truck—American Brake Co.

opponent, as nearly as may be, on the same ground. What hope can a stage line have in opposition to a street car? Ask the old Broadway stage men. A sailing ship, cheap as its motive power is, cannot secure passengers in competition with steamships. What would be the outlook for a single-track road, with hand-brakes, warming and lighting its cars with stoves and oil-lamps and supplying its tenders from tanks, in competition with a double—not to mention a four-track road, with steam heat and gaslights and taking water from track tanks? The conditions are different. It is so in all classes of business. The man who adheres to old, inconvenient methods cannot succeed when others have adopted improved ways, even at the cost of radical changes.

While the elevated roads of New York and Brooklyn are not, properly speaking, trunk lines, they are more like them in their methods than like street railroads, and it is well known that they are suffering from the competition of the latter, since these have adopted a better motive power than horses; and it is clear that the elevated roads cannot recover until they are prepared to meet their opponents on more nearly the same ground.

Irrespective of the distance between stops, whether one block or several apart, facilities for ready movement are vital. The managers of the elevated system are reported as searching for a way to meet this competition, and are groping in the dark after electrical locomotives, hoping that in some mysterious way they will

brakes it was necessary to have a brakeman on each platform; now the brakes are managed by the man on the engine. If it had not been possible to apply the air-brake to all the car wheels separately, but to the engine wheels only, depending on its resistance to hold back the train, it is very evident that the air-brake would not have been adopted. So while we would not consider any system that did not apply its brakes to every wheel on the train, we adhere to the plan of putting our accelerating power all at one end, where it has to overcome all the dead resistance of the whole train, and yet we have a power we can apply to every wheel on the train, to get it under way, as we apply power to every wheel to stop it.

Let us now consider the characteristics of an electric traction system that will enable the trunk lines to meet the competition of the trolley roads for suburban traffic. The trunk line has a large station at its city terminus, the tracks are numerous, and a considerable yard room is required outside, for other service as well as the suburban. While there is a degree of uniformity in suburban traffic, at certain seasons unusual numbers of passengers demand accommodation and require trains that are heavy to haul and inconvenient to handle, especially on local trains, whose additional weight causes delay at every station.

If the road were provided with a system that would enable the running of cars singly or in sets, without the

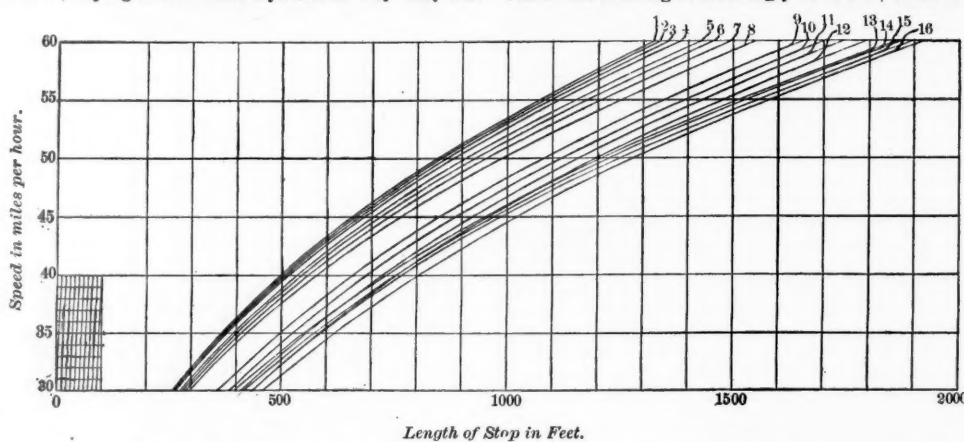


Fig. 3.—Diagram Showing Length of Stops for Different Trains, and as Modified by the Application of Locomotive Truck Brake.

Emergency Stops.		Full Service Stops.	
Truck brake cut-in.....	Curve 1. Six car train. " 2. Five " " 3. Four " " 4. Three "	Truck brake cut-in.....	Curve 9. Three car train. " 10. Four " " 11. Five " " 12. Six "
Truck brake cut-out.....	Curve 5. Six car train. " 6. Five " " 7. Four " " 8. Three "	Truck brake cut-out.....	Curve 13. Three car train. " 14. Four " " 15. Five " " 16. Six "

enable them to move their cars with greater facility, and they hope economy, than at present. But it is difficult to see how a train can be handled with greater facility, because its one engine at the head of the train gets its power from a distance, through an electric wire, rather than directly from a boiler near at hand. The method of operating the train is the same. One railroad manager had a hope that compressed air would solve the problem, but air is a gas and so is steam, and it is

necessity of providing an additional engine, the train could be divided and part of it run through to some convenient point, and the remainder run as a local; or if each car had its own motive power, the train could be run as a whole, without the heavy drag that comes on an engine with an unusually heavy train.

A system must be adopted that is independent of all kinds of weather, especially dry snow and sleet storms; a system that will permit the cars being run singly or in



trains without overloading the motive power; a system that will permit the self-propelled cars threading their way among a complication of tracks in a yard as freely as a locomotive does without any of its details interfering with freedom of movement of other classes of rolling stock; a system that, in an emergency, will permit a regular train being started, part as an express and part as a local, without increasing the units of steam power; or having been started as a whole, may be divided, at any point on the line, and run in more than one section, or direction, without the necessity of providing engines at unexpected times or inconvenient points; as in the case of short spur lines, where the constant expense of an engine and its crew is a marked percentage of the receipts from a light traffic. All parts of this system must be accessible to ready inspection and expose no live parts to any risk of short circuiting.

It is not my intention to consider mechanical details for a number of reasons. In the first place I am not advocating any particular system, for there is none, now generally known, that will meet the requirements. The prestige of the great electric companies has caused the adoption in places of one or the other of their systems; but these experiments have served to show that not one of them is suitable to the conditions indicated in this article. The overhead trolley or the third rail is not to be considered, for in that most important part of a trunk line, the station yard, the poles and wires of the trolley system and the bare conductor of the third rail would cause insuperable difficulties.

There is little doubt that a suitable system can be found, but it must be by giving a fair chance to experienced inventors, aside from those engaged by large companies. Economical considerations may also be met as they are largely questions of the perfection of electrical details and insulation.

With the right system no feature of the mechanism of the cars need prevent their being drawn on any part of the road by locomotives; though of course it is better to keep these cars to their special service.

#### The Pyle-National Electric Headlight.

Electric headlights have come into use very slowly. This is principally because the apparatus is costly, bulky and heavy, and in such form that adjustments and repairs have been somewhat difficult to make. As the ap-

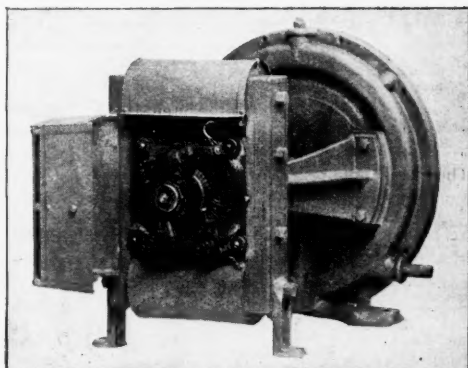


Fig. 4.

paratus is in the care of men not familiar with this class of machinery, trouble has been experienced from lack of knowledge; but there are many railroad men who favor the use of electric headlights provided a suitable form of apparatus can be obtained at a reasonable cost.

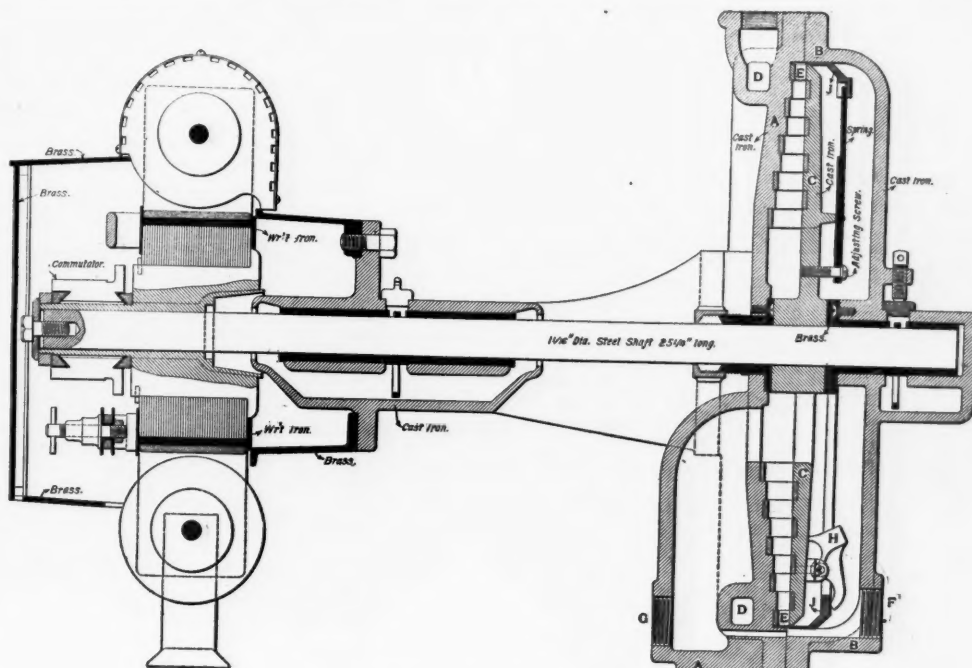
We show in the accompanying illustrations the essential features of the improved headlight patented by Mr. Geo. C. Pyle, who has endeavored to simplify the construction and reduce the weight and cost. The apparatus consists of a steam turbine and a dynamo mounted on the same shaft, and an arc lamp of special construction which replaces the oil light.

Fig. 1 shows the turbine and dynamo; these together occupy a space 26 in. long by 18 in. wide, and are mounted on the smokebox extension, between the smokestack and the headlight. To allow for this arrangement the headlight is placed 19 in. from the stack. Figs. 3 and 4 are views with the cover plates removed.

As seen in Fig. 5, the apparatus consists of a 1 1/2-in. steel shaft, 25 1/4 in. long; on the right-hand end is mounted the steam turbine and on the other the dynamo. The shaft is supported by two phosphor bronze bearings, one 3 1/2 in. and one 10 in. long, ring oilers being used.

The turbine is made up of two cast-iron plates A and B (Fig. 5) encasing a third plate, C, which is fixed to the

shaft. There are three openings into the cored chamber, D, through which live steam can be admitted, but the lower one is usually used, the others being plugged. From chamber D, four ports, shown in Fig. 3, permit



The Pyle-National Electric Headlight.

steam to pass into the space E, where it comes in contact with five buckets, before exhausting, causing the plate C to rotate; the surfaces of the two outer rows of buckets are curved while the three inner ones are planes set at an angle of 45 deg., the clearance between faces being 1 1/8 in. The exhaust takes place through either opening F or G, the one not used being plugged. If opening G is used a small hole is bored to provide an outlet for the condensed steam. A 3/4-in. feed-pipe is used to supply steam, and the exhaust pipe is 1 1/4 in. in diameter; the combined area of the four port openings is less than that of a 1/2-in. pipe. There is a difference of 25 lbs. between the steam pressure of the boiler and that in chamber E. The turbine develops a little over 1 H. P. when running at the normal speed of 1,900 revolutions per minute.

A very simple and effective form of governor controls the speed. This, as shown in Figs. 3 and 5, consists of a thin ring, J, carried by four springs, their tension being regulated by means of adjusting screws. There are four small castings, H, so pivoted that as the speed increases, they press, by centrifugal action, against the ring J, decreasing the opening through which live steam is admitted. The adjusting screws can be reached by removing a small cap on the outer casing. The speed can be increased or decreased by changing the tension of the governor springs.

The dynamo is built to occupy as small a space as possible. By removing the screw at the end of the shaft the armature and commutator can be removed. The frame is of wrought iron, the armature of the Gramme toothed type with 240 turns of wire, and there are 40 sectors on the commutator. The brush holders are fixed and the brushes can be removed without changing the tension on the springs. One brush is of pure graphite and one carbon. Where the wires are connected to the dynamo the hole in one binding post is much larger than

power lamp. It will therefore be seen that the light here used is almost 4,000 candle-power.

The weight of the revolving parts, including the shaft, turbine wheel and armature, is 41 lbs.; and the total

weight of the whole is 250 lbs. The old types of electric headlights weigh 780 lbs.

Fig. 6 shows the arc lamp used, the wires being connected to the ends of the carbons by clamps. The lower

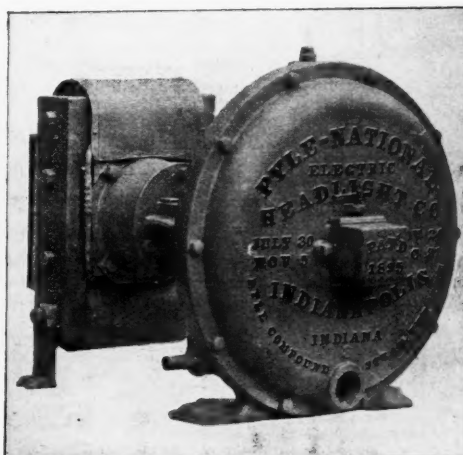


Fig. 1.

carbon, by means of a telescopic spring, is held up against a stop so its upper end is always in the same position. The upper carbon passes through a ring of slightly larger diameter, so that when the ring is in a horizontal position the carbon will slip down, but if turned from this plane it holds the carbon in place. This ring is connected by a small wire to a lever, one end of which is operated on by a solenoid in circuit with the lamp, and the other by a spring such that their actions oppose one another.

When the dynamo is first started the spring acts to keep the carbons together. As soon as the current is of sufficient strength the solenoid acts through the small lever and wire and raises the upper carbon, establishing the arc. Whenever the distance between the carbons becomes too great the current is weakened, and hence the spring acts to lower the upper carbon. The slight changing of the position of the ring allows the carbon to slip down. One set of carbons will last about eight hours.

These headlights have now been in service on the Cleveland, Cincinnati, Chicago & St. Louis between Indianapolis and Peoria since April, 1896, and on the Terre Haute & Indianapolis since October of the same year and have given good service. They are made by the Pyle-National Electric Headlight Company, Chicago.

#### Baldwin Locomotives for China.

We have recently noted the contract placed with the Baldwin Locomotive Works for locomotives for the Imperial Railways of North China. Twelve are now under construction. They are all for 4 ft. 8 1/2-in. gage, to burn bituminous coal. The principal dimensions are as below:

Four American type locomotives:  
Cylinders.....19 in. x 24 in.  
Driving wheels.....84 in. diam.  
Boiler, straight top radial stay.....60 in. diam.  
Firebox.....84 in. long, 42 in. wide  
Tubes, 228 in. number.....2 in. diam., 12 ft. long



Working steam pressure.....	180 lbs.
Heating surface: tubes.....	1,470 sq. ft.
" firebox.....	130
" total.....	1,600
Total wheelbase.....	23 ft. 2 in.
Driving wheelbase.....	8 ft.
Weight in working order, total about.....	116,000 lbs.
Weight on drivers, about.....	71,000 lbs.
Six-wheeled tender of 4,800 gallons capacity.	
Four Mogul locomotives:	
Cylinders.....	19 in. X 24 in.
Driving wheels.....	60 in. diam.
Boiler, straight top.....	60 in. diam.
Firebox.....	84 in. long, 42 in. wide
Tubes, 238 in number.....	2 in. diam., 12 ft. long
Working steam pressure.....	180 lbs.
Heating surface: tubes.....	1,470 sq. ft.
" firebox.....	130
" total.....	1,600
Total wheelbase.....	23 ft. 3 in.
" driving wheelbase.....	15 ft.
Weight in working order, total about.....	129,000 lbs.
on drivers.....	107,000 lbs.
Six-wheeled tender of 4,800 gallons capacity.	
Four switching locomotives, 6-wheeled connected type:	
Cylinders.....	16 in. X 24 in.
Driving wheels.....	50 in. diam.
Boiler, straight-top.....	50 in. diam.
Firebox.....	71 1/2 in. long, 34 in. wide
Tubes, 146 in number.....	2 in. diam., 11 ft. 3 in. long
Working steam pressure.....	180 lbs.
Heating surface: tubes.....	853 sq. ft.
" firebox.....	81
" total.....	934
Total wheelbase.....	10 ft.
Weight in working order, about.....	90,000 lbs.
Tank on sides of boiler.....	1,000 gals. capacity

### Heavy Street Railroad Track Construction.

The accompanying illustrations show the heavy construction of the new double tracks which the Metropolitan Street Railway Company, Kansas City, are now laying in Wyandotte street between Second street and Southwestern Boulevard. The length of the new tracks is about 7,600 ft., of which 6,400 ft. is trench work, the balance being ordinary tie construction.

A section of the rails used is shown in Fig. 1; these are furnished by the Johnson Company, weigh 163 lbs. per yard, and are shipped mostly in lengths of 60 ft. There are about 500 joints of the Falk cast-welded type. The rails are tied together by 3/4-in. rods, spaced every 10 ft. throughout the trench work, and every 7 1/2 ft. on the tie construction.

As shown in Fig. 2, the trench work consists of a longitudinal trench, for each rail, 15 in. deep, 20 in. wide at the top and 16 in. wide at the bottom. At distances of 10 ft. oak blocks (Fig. 3) are placed for carrying the rails while lining, surfacing and cast welding the joints. The trenches are filled with concrete under and around the rail and a row of granite paving blocks are

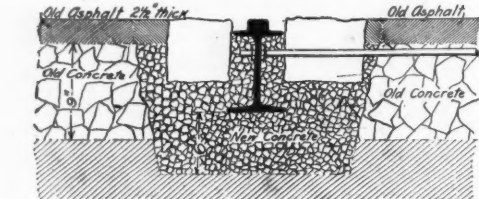


Fig. 2.—Heavy Track Construction for Street Railroad.

placed on either side of the rails, level with the street; these blocks are grouted in with Portland cement mortar.

In addition to the cast joints the rails are bonded with

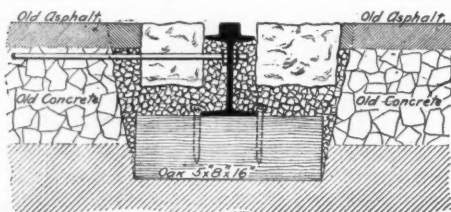


Fig. 3.—Oak Blocks in Trench.

heavy copper wire. The American Railway Construction Company, Chicago, has the contract for the track work which will be finished about May 1. The amount of the bid was \$110,000.

### The Pennsylvania Organization.

The new "organization" of the Pennsylvania Railroad has been issued. From it we gather that there are to be no further immediate changes in the officers of that road or their duties. The new General Superintendent of Transportation, Mr. Trump, has exactly the same field as his predecessor, while Mr. Joyce, as Freight Traffic Manager, appears to cover about the same ground as he did when General Freight Agent. This last title has been abolished, and the two Assistant General Freight Agents now report to the Freight Traffic Mana-

ger, just as formerly they reported to the General Freight Agent.

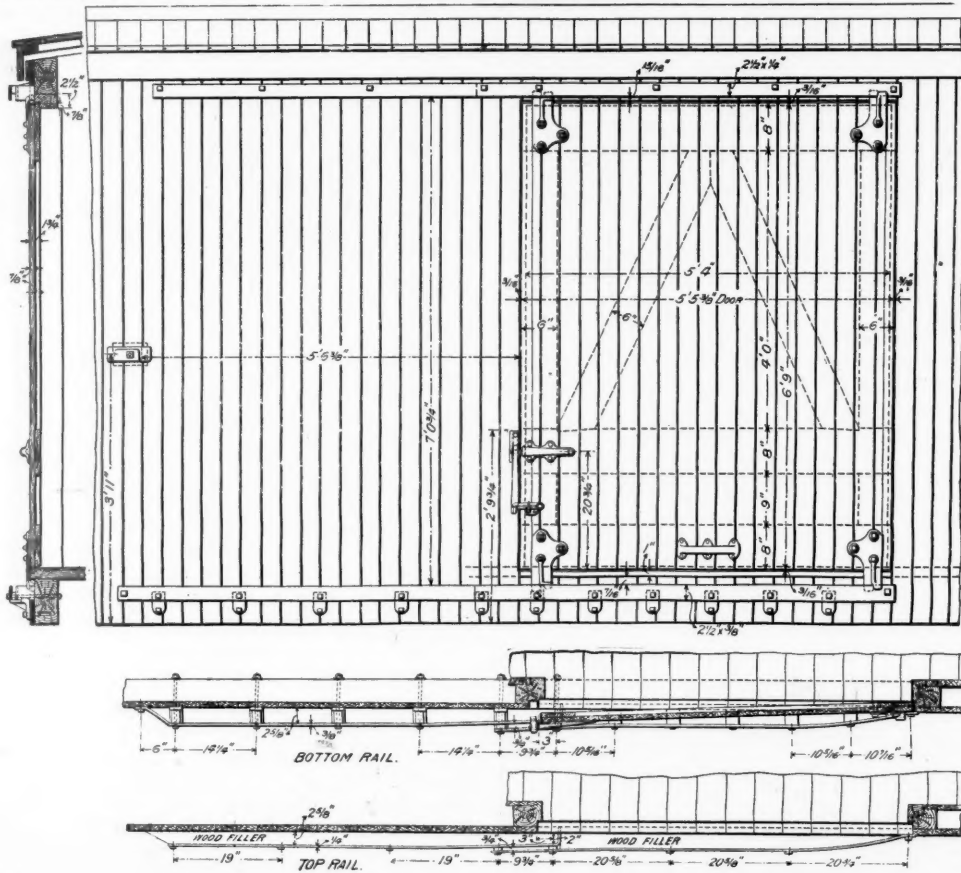
It will be remembered that some years since the Pennsylvania resorted to pretty much the same expedient. Mr. Wilson was then promoted from General Freight Agent to General Freight Traffic Agent, and was assisted by a Local Freight Agent and a Through Freight Agent, an arrangement which continued till Mr. Wilson went to the Poughkeepsie Bridge Company. There was quite a little opportunity for criticizing the wording of the titles then, and there is opportunity now. Possibly, however, the present *modus vivendi* is only temporary; and certainly the nomenclature is not so bad as that on the railroad which possesses, all at once, a General Traffic Manager, a General Freight Agent and a General Freight Traffic Agent.

The organization of the Pennsylvania Railroad Company, though a written document, is as readily amended as is the British Constitution, and a glance at the amendments gives one a fair idea of the needs and policy of the company. Till within a few years one of the

He shall assist the President in other matters relating to railroads owned, operated or controlled by the company, and perform such other duties as the President of the Board may assign to him. The Second Vice-President shall be assisted by a Chief Engineer and a Chief of Motive Power.

The Chief Engineer shall, under the direction of the Second Vice-President, have charge of all engineering and construction work upon the railroads owned, operated or controlled by the company, and be responsible for the proper preparation of plans, specifications and estimates connected therewith; and also for the preparation of plans and specifications for all bridges and important structures. He shall keep an account and have charge of the distribution of steel rails for construction and renewals, and shall perform such other duties as may be assigned to him by the Second Vice-President, the President or the board.

The Chief of Motive Power shall, under the direction of the Second Vice-President, have general supervision of the motive power department, so far as may be necessary to preserve the standards and systems of the company and insure adherence thereto. All plans for locomotives, rolling and floating equipment shall be submitted by him to the General Manager for approval as standard. He shall have charge of the organization of the car trusts; keep himself informed of the leases and other arrangements connected therewith, and keep a record of the equipment furnished thereunder, and of its condition. He shall perform such duties in connection with the motive power and equipment of the lines west of Pittsburgh and the facilities for the construction and maintenance of the same as may be assigned to him by the President.



The Hoke Flush Car Door.

Vice-Presidents has been an engineering expert. Of these the last was Mr. DuBarry. On his death the organization was changed, and the new Vice-President shared the conduct of the Transportation Department with the First Vice-President and the General Manager, while an Assistant to the President took charge of engineering questions. It is fair to assume that at that time the Directors had come to the conclusion that the railroad had at last been built, and that operating or transportation questions had assumed a superior importance. This seems the more likely, as only a few years before, they had given the General Manager an Assistant in the General Superintendent of Transportation.

Now, as we have noted in a previous issue, a traffic vice-presidency has been created, from which we may assume that the Directors recognize a present necessity, that of securing and retaining business.

We may, then, conclude that the Pennsylvania first exerted its best efforts in building its road and then in running it, but that now the time has come to do its best to secure business. We all know what this company has done in the lines of engineering and operation, and shall await with interest the results of the additional energy now to be put forth in the field of its traffic development.

We quote the new parts of the "organization."

The President shall have general supervision and direction of all departments of the company's service, and be assisted in the performance of his executive duties by the Vice-Presidents. He shall have charge of the seal of the company.

The First Vice-President shall have special supervision of the treasury and accounting departments and of the Employees' Saving Fund, and shall have general supervision of the financial matters of the corporations in which this company may have a pecuniary interest. He shall also assist the President in matters connected with the operation and management of the railroads controlled directly or indirectly by the company west of Pittsburgh. He shall, under the direction of the President, attend generally to the executive business of the company, and shall assist the President in all matters relating to the railroads in which this company may have an interest and perform such other duties as the President or the board may assign to him.

The Second Vice-President shall have special supervision of the transportation department. He shall also have general supervision of the purchasing, real estate and insurance departments. He shall have general supervision of all construction work upon the railroads owned, operated or controlled by the company; the plans, estimates and contracts for all such work to be submitted to the President for his approval.

The Third Vice-President shall have in charge the procurement and development of traffic for and upon the lines of the company. He shall have special supervision of the freight and passenger departments, and all the operations of those departments shall be subject to his approval, or that of the President. He shall have special charge of those relations with competing companies and connecting lines that may be associated with the performance of his duties. He shall assist the President in other matters relating to the railroads owned, operated or controlled by the company, and perform such other duties as the President or the board may assign to him.

The First Assistant to the President shall specially assist the President in engineering questions pertaining to any of the lines of railroad or properties owned, controlled or operated by the company. He shall also have general charge of the promotion of new lines of railroad in which the company may be interested, and of the corporate work in connection therewith, the plans, estimates and contracts for all such work to be submitted to the President for his approval.

The First Assistant to the President shall be aided by an engineer of branch lines, who shall assist him especially in matters connected with the work under his charge; and shall perform such other duties as may be assigned to him by the President or the board.

There shall be two additional assistants to the President, who shall perform such general duties as may from time to time be assigned to them by the President.

The Freight Traffic Manager shall, under the direction of the Third Vice-President, have charge of the freight department. He shall be charged with making arrangements and rates for the freight traffic over the lines operated by the company, and shall make the necessary negotiations and arrangements with other railroad and transportation companies or individuals in relation thereto. All freight rates shall be made under the authority of the Third Vice-President, or that of the Freight Traffic Manager. The Freight Traffic Manager shall be assisted by an Assistant General Freight Agent in charge of local traffic, an Assistant General Freight Agent in charge of through traffic, a Coal Freight Agent, a Freight Claim Agent, Division Freight Agents, a Manager of Empire Line.

### The Hoke Flush Car Door.

The car door shown in our illustration is a new one having several peculiar features. As will be seen, the door has a top and bottom rail, each of which is divided into two parts. For a distance of about 20 in., one end of the rail at the right gradually slopes in to the side of the car. By this means, the front edge of the door is guided into the recess in closing. The other end of this rail overlaps one end of the rail at the left a short distance so that the door when open may stand clear of the recess and thus allow an opening the full width of the doorway.

The end of the left rail which is nearest the doorway is bent perpendicular to the side of the car, and the lugs



of the slide which runs on this rail are set on opposite corners to allow the slide to pass around the right angle in the track when the door goes into the recess. Wood fillers are inserted between the sections of the top rail and the side of the car to protect the top of the door when it is either partly or fully open.

The device for moving the door in and out of the recess and for fastening it when closed is the Hoke fastener which has been used on the Pennsylvania Railroad's refrigerator cars for a number of years. The fastener is changed somewhat to meet the requirements of the flush door. When the end of the lever is raised, a toe engages with a pocket in the side of the car, and throws the door out in position to be opened. When the door is to be closed, a slot in the lever allows it to be pushed sufficiently for the toe to catch in the pocket, so that when the lever is lowered the door is drawn into the recess where it is held by throwing over a latch which can be sealed or locked with a padlock.

When door is closed the side of the car presents a smooth surface, the small lever, or fastener, and the handle being the only parts exposed.

The whole outfit is simple and not liable to get out of order, and broken castings can be replaced without removing the door.

The Pennsylvania Railroad has tried several of these doors during the last two years, and proving satisfactory, 50 cars have been equipped to give them a more thorough test.

#### Special 50-Ton Stone Car.

The engraving shown herewith is from a photograph sent us by Mr. W. A. Stowell, General Manager of the Montpelier & Wells River road, of a platform car recently built for the Barre Granite Transit Co., of Barre, Vt., to carry a large stone to New Orleans. The peculiarity of this stone, aside from its great weight, was its great height, its outside dimensions being 14 ft. x 14 ft. x 3 ft. thick, necessitating the use of a car on which the block could be loaded with its lower edge very near the ground. In point of fact, the stone, as loaded on the car, was

quired 10 cars, all of which were sent over the Montpelier & Wells River, the Boston & Maine, the Canadian Pacific, the Wabash, and the Illinois Central.

The stone shown in the cut weighs 61,200 lbs., and it is believed to be the largest ever transported by railroad in this country. The monument is to rest on a bed of masonry 6 ft. thick, which is supported by piles driven 50 ft. deep. The monument was designed by Alexander McDonald, of Cambridge, Mass.

#### A Dust Guard for Journal Boxes.

The accompanying cuts illustrate a new dust guard, the invention of Mr. Thos. H. Symington, M. E., Assistant Superintendent of the Richmond Locomotive Works. It consists of a piece of  $\frac{1}{2}$ -in. iron, *B*, backed by a similarly shaped piece of felt, *A*. A ring, *D*, of flexible, vulcanized fiber, is pressed against the iron plate by a spring, *C*, made of  $\frac{1}{4}$ -in. steel wire, which spring also presses against the rear wall of the guard slot in the regular cast-iron journal box. This pressure holds the felt against the rough cast surface of the front wall of the slot. Joints are thus maintained between the plate and the box, and between the ring and the plate. The spring, by pressing on the beveled side of the fiber ring, tends to close the ring on the axle, thus giving a tight joint all around the axle. A piece 2 in. long is cut out of the

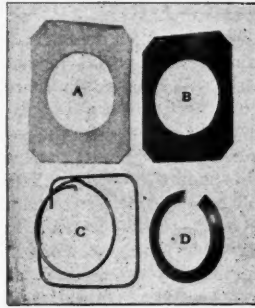


Fig. 1.

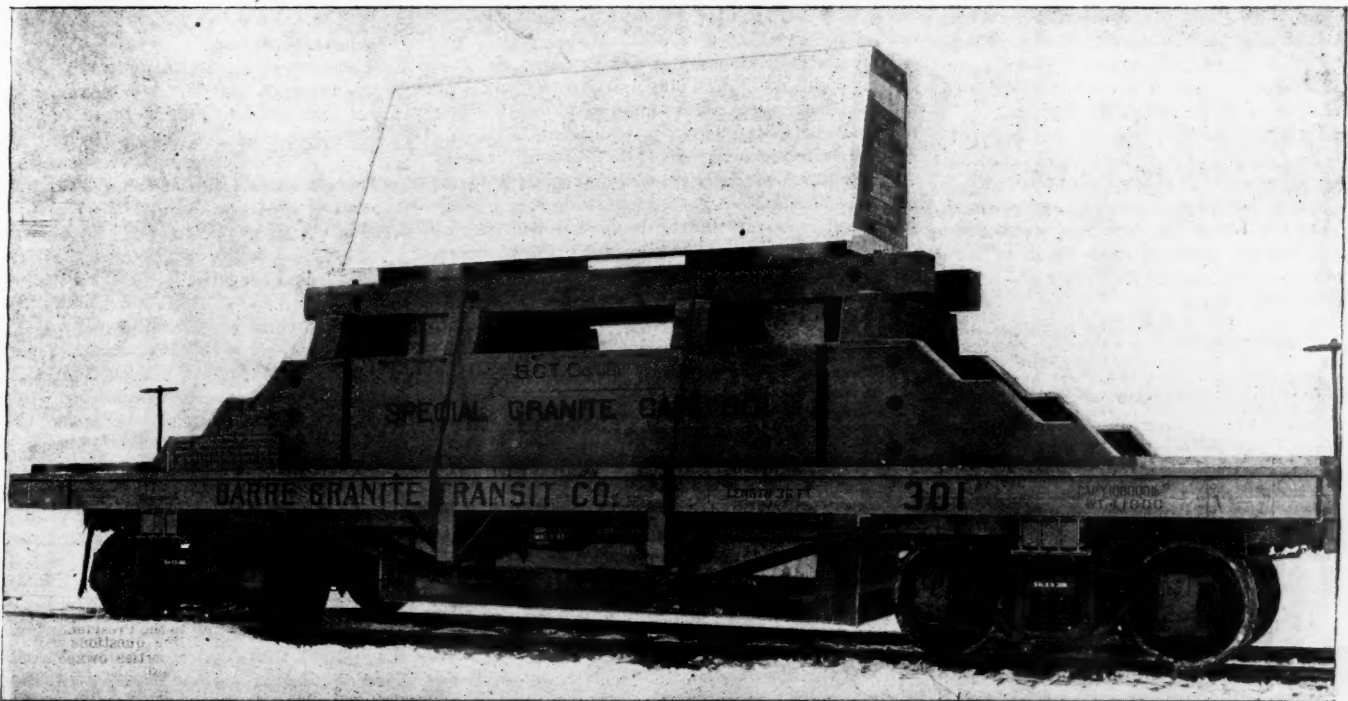
fiber ring allowing it to close about  $\frac{1}{4}$ -in. in diameter as it wears. The opening in the ring thus made comes on top of the axle, at which point a joint is maintained by the plate resting lightly on the axle. The spring is pre-

#### Railroads in Korea.

Soon after the treaty between the United States and Korea opened up some of the musty corners of the Hermit Kingdom men of enterprise and adventurers began to think of a new field for exploitation. Explorations and surveys were made of the country by pioneers of different nationalities—by Russians, Americans, Germans and Japanese. It was learned that the mountainous country is varied with rich valleys, which when properly cultivated, and the mineral resources developed, would sustain a much larger population than now subsists upon the soil, which still shows signs of the defeat and devastation sustained at the hands of the Japanese, three centuries ago. This country will undoubtedly develop in a nation, justifying and supporting railroads, even though now it hardly has common roads suitable for wheeled traffic.

In 1893 Mr. James R. Morse, President of the American Trading Co., 182 Front street, New York, was asked by the Korean government to come to Korea to consult about building railroads. He favored building a railroad from Seoul, the capital, to Chemulpo, its port, about 25 miles distant. The government wished him also to take a concession for a road to Fusan, at the extreme southeastern end of the peninsula, and he agreed to take the general concession, but to build at once only the line between Seoul and Chemulpo. As this contract was about to be signed, the Chinese interfered and prevented its completion.

The Japanese, in 1894, when they had military possession of the country, attempted to get concessions for mines, railroads, etc., but with so many legations watching them succeeded only in getting consent for the Seoul-Chemulpo road. Complete surveys of this line were made by them at that time, but the attitude of Russia seemed to frighten them off from the actual work. Yet had the war lasted longer, or the Japanese not been successful in the naval battle off the Yalu River, the railroad would probably have been built as a military necessity, as was contemplated early in the campaign before they had pricked the shell which so unex-



Fifty-Ton Car for a Load Fourteen Feet High.

Built by the MICHIGAN PENINSULAR CAR COMPANY, Detroit, Mich.

only 8 in. above the level of the top of the rail. The center of the stone was cut out for the purpose of reducing its weight, leaving an opening 8 ft. square, and the principal bearing of the load is upon the transverse timbers within this opening, which are mostly covered, in the picture, by the canvas tarpaulin, but which are partly visible where they rest on the uppermost longitudinal timbers.

This stone was ordered by Mr. Daniel Moriarty, for the base of a monument to be erected in Metairie Cemetery, New Orleans; and to avoid crossing bridges in the city of New Orleans which are of doubtful strength, a special track was laid for about one mile to take the car to the cemetery. The stone was quarried and shipped by Mackie, Hussey & Co., of Barre, Vt. The car was ordered by the Montpelier & Wells River, and was built by the Michigan Peninsular Car Company of Detroit. The principal dimensions are as follows:

Length.....	36 ft.
Width.....	9 ft. 2 in.
Height.....	4 ft. 3 in.
Weight.....	41,000 lbs.
Weight, including blocking.....	49,500 "
Weight of trucks, each.....	8,300 "
Weight of wheels.....	700 lbs. each
Size of journals.....	5 3/4 in. x 9 in.
Six truss rods, diameter, each.....	2 1/4 in.
Capacity, with load between bolsters.....	100,000 lbs.

The car has Tower couplers and Westinghouse air brakes.

The entire shipment of stone for the monument re-

vented from turning in the journal box by having its outer coil made square. One end of the spring is bent down between the ends of the fiber ring, to keep the opening in the ring on top of the axle. No movement of the axle in the box due to jacking for a new brass, shifting of bearing when brakes are

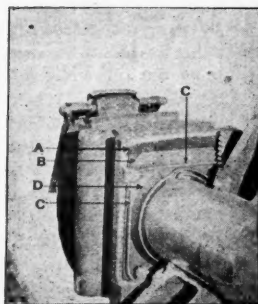


Fig. 2.

applied, or ordinary wear of the brass affects the guard, as the plate is free to shift in any direction on the felt washer. The spring holds the plate firmly to the box, so that there is practically no wear on the spring, plate, and felt, and these seldom need renewal. The fiber ring after running probably two years, is prevented from further wear by the ends coming together, when it will run indefinitely as a solid guard. Fig. 1 shows the parts of the guard as applied to the M. C. B. box, and Fig. 2 shows the guard in position, the wheel and back of the journal box being broken away so that it may be seen.

pectedly collapsed. But when military necessity was no longer pressing—that is, when all their later reinforcements were sent by sea instead of through Korea—little was heard of the railroad to Chemulpo, although the right to build it had, I believe, been transferred to Japanese civilians.

Not until after Feb. 11, 1896, when His Majesty was safely ensconced under the broad folds of the Russian flag, did rumors about a railroad to Chemulpo, again become current. Then it was announced that Mr. Morse, who had only a few months previously obtained a valuable concession for gold mines in the northwestern part of the Peninsula, had been granted a concession for this Seoul-Chemulpo line. This concession was given March 29, 1896, with the approval of Russia and the tacit consent of Japan.

The concession is for 25 years, at the end of which time the Korean government may buy the road on appraisal. If not bought at that time the road will remain the property of the company for a further period of ten years, at which time and at each subsequent period of ten years the government will have the privilege of buying it. Work of construction must be begun within one year from the signing of the contract, and must be completed within three years. Korean labor must be employed as far as possible. The government is to

(Concluded on page 188.)





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#### EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

#### "Injustice" in the New York Export Grain Trade.

The managers of the Joint Traffic Association have adopted a more considerate attitude toward the New York grain exporters, who have long complained because Newport News, Baltimore and other ports are getting an increased share of the corn trade, at the expense of New York, and the whole subject is again discussed in the *Journal of Commerce*. There is no question, of course, that New York has suffered a large relative, and a smaller absolute, loss in export grain, and from the statistics it seems plain that she would have suffered badly, perhaps about as badly as now, if Galveston and New Orleans had never entered the field. There is a great abundance of railroads as compared with the amount of business to be had, even when we consider the Atlantic ports alone. The *Journal of Commerce* says:

The difficulties of the situation we recognize fully. The other roads will very likely resort to rate cutting if the New York roads refuse to allow them the differential they have long claimed. But the New York roads hardly need to be reminded that under the differential they are losing heavily on the grain business. They might as well have a rate war as to lose their business without one. The demonstration of the unjust effect of the differentials upon this port is so conclusive that we can hardly believe that the roads to the south of us will not recognize the propriety of revising the scheme. We trust that it will not come to a rate war. The facts are so obvious that it ought not to. The differential is carrying to other ports the grain that would under normal conditions come here, and the roads that now receive the differentials must admit this fact and waive their claims to a system which was designed to do justice between competing roads, but which certainly under present conditions is doing great injustice.

This paragraph is from a conservative paper of high character, and the unreflecting statements contained in it should, therefore, not go unchallenged. It is not just as well to settle a rate dispute by war as by peaceful negotiation. Between nations, war means destruction of property and sacrifice of lives. Between railroads there is not generally any sacrifice of life, and the harm suffered by the contestants' physical property is not so palpable as that which results when cities are bombarded and burnt and railroad tracks are torn up by hostile armies; but where a community needs a good railroad and in consequence of a rate war has to put up with a poor one, the damage is real and serious.

A railroad entering on a war deliberately calculates upon wasting its own and its enemy's revenue by carrying goods at less than a reasonable rate, and desperate war means carrying at less than cost, a definite throwing away of money on every shipment. The whole philosophy of the war is embraced in the inquiry, Can we compel our enemy to exhaust his resources before we exhaust our own? On this depends the result.

The normal method of readjusting the rates for carrying grain from the West to the various Atlantic ports, assuming that they need to be readjusted, would be to make a small advance by the line which gets too large a share of the business (or a reduction by the other line), and then wait awhile and see what effect it had upon the distribution of the shipments. If the competing lines cannot agree upon how small

the reduction or advance ought to be, there is nothing to do but for the aggrieved line to act independently, but still to make the reduction very small. Wars are nearly always characterized by a big, dramatic "slash" in rates at the outset.

It will be answered that the result is the same in the end whether rates are reduced by a dozen small changes or one sweeping one. This would be true if all parties put on their war paint at the outset and refused to negotiate with one another, as has generally been the case in the past. But now we have machinery for conducting negotiations—the Board of Managers—which is so much better than any former instrumentality of the kind that there is no good reason for interrupting friendly intercourse for a single day. Why cannot the grain-rate controversy be settled without carrying a single carload below cost?

Our contemporary assumes it to be a settled fact that under normal conditions much of the grain now going to Baltimore or Newport News would be exported through New York. But what are normal conditions? The normal route from Nebraska to Liverpool is that over which the grain can be carried cheapest, all things considered. Assuming that this has in the past been through New York, who can say that it is the same now? It is admitted that the cost of transferring from cars to vessels is less at other ports than at New York, and the railroads leading to the other ports have been improved in the last five years. The appetite of these other roads for traffic is also an element of the problem that must be dealt with. If one of the lines running to what the New Yorkers call the "outports," has more cars standing idle, or has a more desperate struggle to pay its bond interest than the more northern roads have, there is no use in trying to convince its managers that they should not strain every nerve to get traffic, at any rate above cost.

If a perfectly straight and level railroad were to be built, at low cost, from Chicago to New York, and were to dump corn into ocean vessels at a terminal charge of only 25 cents a carload, the New Yorkers would at once argue, and with reason, that the normal route, that is, the best and cheapest, had been found. It is in order to remember that an argument somewhat in this line, and not without sound basis, is just what the other ports are relying on to support their present claims.

To say that their rates are so low as to work "great injustice" to the New York lines is to ignore a dozen important elements in the problem. Indeed, we fear that Justice doesn't worry herself much about this matter either way. If the railroad men were asked about it, we suspect that it would be found that neither her interests nor those of any other goddess were considered to any great extent when the differentials were established. The differentials were the result of the compromising of a contest which, if it had been continued to the end, would have been decided by might; and if might makes right it is perhaps allowable to say that justice was interested in the matter; but it is doubtful whether any three of the parties interested could have agreed in their estimate of the equitableness of the rates that were established. The tariffs in force to-day may, indeed, be depriving the New York railroads of large quantities of freight which, under former conditions, they would have received, but there may be no more injustice about it than there is about the thawing out of the Erie canal in the spring.

#### The Eau Claire Lumber-Rate Case.

The recent action of the Chicago, Milwaukee & St. Paul, in giving notice to the Western Freight Association of its intention to conform to the order of the Interstate Commerce Commission and reduce rates on lumber from Eau Claire and other Wisconsin points to the Missouri River, and its subsequent notice of a restoration of the old rate, presents several interesting questions in regard to the application and enforcement of the Interstate Commerce law, and as the principles that have to be here recognized are often met with in competitive-rate questions elsewhere, it will be worth while to recall the circumstances briefly.

On July 7, 1890, the Eau Claire Board of Trade filed a complaint with the Commission, charging that the carload rates on lumber from other points in Wisconsin to the Missouri River, over the St. Paul road, discriminated unjustly against Eau Claire. Before the hearing of the complaint, about all the Northwestern roads, as well as several lumber companies and boards of trade, had been made parties to the suit, the Chicago, St. Paul, Minneapolis & Omaha road having also been allowed to intervene, on its own motion. Voluminous briefs were filed, and the hearing of the case occupied several days at Chicago in September, 1891.

The defence was that all the lumber rates from the Northwest are interdependent; that they were fixed, after a long period of demoralization, by reference to an arbitrator; that his decision and award had been accepted by all the lines as equitable and that since May 10, 1884, the differentials so established and known as "the Bogue differentials" had been in effect and had worked satisfactorily; that to comply with the request of the Eau Claire Board of Trade would at once bring about reductions from other points and thus nullify the effect of a reduction from Eau Claire.

The Commission, after reviewing the case thoroughly, came to the conclusion that the equities of the situation warranted an order restraining the St. Paul road from charging from Eau Claire more than 2½ cents per 100 lbs. above the rate from La Crosse and Winona; in other words that while Eau Claire was not entitled to be placed on a parity with the other towns mentioned it was entitled to protection to the extent above noted. The decision, which is a long one, is by Commissioner Knapp. The order was entered in June, 1892.

The Western Traffic Association was then in existence and, if we remember aright, the case went before the Board of Commissioners of that body on a proposition from the St. Paul road to obey the order. A disagreement resulted, and the St. Paul proceeded to adopt the reduced rates. The other roads promptly met these rates, and the St. Paul then notified the Commission that it was impracticable to comply with its order, and restored the rates. Nothing more was heard of the matter until last November, when the Commission sent a sharp letter to the St. Paul road requiring it to at once comply with the order, under threat of legal proceedings if it failed to do so, and scoring the St. Paul and the other roads for rendering the order inoperative. The St. Paul thereupon for the second time complied with the order and put the rate in effect once more. Again the Omaha road promptly met the reduction and once more the St. Paul has restored its former rates.

We have, therefore, a case where the Commission after a thorough investigation decided that one locality was being discriminated against and ordered the carrier serving that locality to afford a measure of relief; the compliance (twice performed) on the part of the defendant, under protest, and in both instances a nullification of the sought-for relief by the action of other carriers not amenable to the order in question.

The question which first presents itself is whether or not a common carrier, ordered by the Commission to do a certain thing, and having complied with the order, is justified in rescinding its own action without first applying to the Commission for relief from the operation of the order, even though at the time of ceasing compliance the Commission is notified that further compliance is useless as a measure of relief for the complainant. The Commission certainly may very properly hold that the defendant should first have given it notice of the reason why it was impracticable to comply with the order, a prayer for relief being at the same time presented. If this were done and relief not granted within a reasonable time, either by rescinding the order or by suspending it until a further investigation could be had, the defendant would then be justified in disregarding the order, on the ground that further compliance would work a hardship, in that it would cause a needless sacrifice of revenue without any benefit to the public.

As regards the action of other carriers in continuing, by changes in their tariffs, a condition of affairs which the Commission has decided, in a case against their neighbor, to be unjust, it would undoubtedly be claimed, and with reason, that inasmuch as the order did not apply to them there was nothing to prevent them from taking any action which they might see fit. The remedy in such a case as this would be for the original complainant to make a complaint against these carriers and thus institute a new proceeding, which the Commission could hear and determine upon its own merits.

Of course, every one knows that when such a controversy as this is examined on its merits—broadly considered, that is, taking into account the interests of all the carriers and all of shippers that would be affected by a change—there is nothing to do but to compromise, and it is often necessary to put up with a compromise which seems to have some pretty clumsy joints in its framework. This being so, why should not the Commission give up the attempt to get out a judicial decision which shall have the permanency of the pyramids, and the lofty impartiality which is found only in the decisions of judges who know nothing at all about the essence of the subject adjudicated, and enter into a conference with the railroads on such friendly terms as will tend to evolve the best practical results for all concerned?



It cannot be that either of the roads separately, or both together, can have any interest other than to promote the best good of the lumber business in the region that this decision deals with, and it is possible that an intelligent third party could cause their negotiations to issue in the most beneficial result much more quickly than would be the case if the road managed the controversy without outside help. To take a hand in such negotiations ought to be one of the chief functions of the Interstate Commerce Commission. Indeed, in matters of less moment, the Commission already does good to many parties by semi-private adjudication of disputes; the same kind of treatment may be applicable to larger controversies. It does, indeed, seem like a culpable abandonment of justice to admit that a question affecting the freight bills on thousands of carloads of lumber, to be paid by the shippers of a vast territory, cannot be satisfactorily settled by judicial methods, and that all the powers of the government are insufficient to insure equity to all complainants; but if this is really the case, if all the wisdom available fails to cure the difficulty, why not frankly admit the fact?

#### An English Freight-Rate Adjustment.

The Railway Commissioners of Great Britain have just given an important judgment on which a very large amount of money depended. It will be remembered that an Act of Parliament passed in the year 1894 gives to the Commission authority to prevent any increase in existing freight rates, unless the company making it can satisfy the Commission that such increase is reasonable. The Midland road acknowledged having increased by 2½ per cent. the rates on the enormous traffic in coal carried to London. The coal merchants objected that the increase was unreasonable, and in defense of its action the road produced a mass of figures to show that the expenses of working its mineral traffic increased between 1880 and 1892 from 39.75 per cent. to 48.58 per cent. of the mineral earnings. Round these tables of figures, very able lawyers being engaged in it, the battle raged for some days.

Some of the counsel endeavored to show (a) that the years were improperly chosen for purposes of comparison, (b) that the figures were improperly compiled and included a large number of irrelevant items and (c) that the ratio of expenses to earnings was altogether an improper test and that the true test was to be found in train-mile receipts and expenditure (ton-mile statistics do not exist in England at all). In the result the presiding judge and one of the lay members held (the second lay member dissenting) that the railroad company's action was justified and that the increased rate was valid.

The railroads have undoubtedly won a considerable victory, and the shippers and consignees, who cannot possibly know in advance what statistics the roads may have available to prove their case, will probably hesitate before they start a similar fight in the future. On the other hand, the companies will not lightly risk a battle, seeing how near they came to being worsted in this contest.

But the general English public have been a good deal surprised—one might almost say scandalized—at the course the case has taken. The Englishmen are firmly persuaded that railroad rates are a matter so simple that any person of ordinary intelligence may understand all about them by the light of nature. And yet they find Mr. Justice Collins, one of the most distinguished judges on the Bench, whose eminent judicial qualities have just led to his appointment as one of the arbitrators on the Venezuela Boundary Commission, and Sir Frederick Peel, who has been engaged for 23 years in deciding questions of railroad rates, in flat disagreement, not only as to the facts of the comparison of the mineral expenses, but even as to the basis which ought to be adopted in order to compare at all.

Economists will possibly be even more dissatisfied than the general public, for the Commission Court appears to have been unanimous in thinking that an increase in rate for any category of traffic must be justified by an increase in cost for that particular traffic, and conversely that the increase of charge must be laid where the increase of cost arises. Yet, if there be any one principle of railroad economics more universally accepted than another, it is this: that the cost of the railroad establishment as a whole should be charged upon that portion of the traffic which can bear it best. In other words, an increase in cost of carrying coal would much more justify an increased rate for silk hats and velvets, or, possibly, for passengers, than an increased rate for coal. But to such a claim the Railway Commission would presumably refuse to listen.

The feeling of dissatisfaction with which this

latest proof of the impossibility of imposing rates upon the companies *ab extra* has been received, is strikingly illustrated in an address delivered by Mr. Balfour Browne before the London Chamber of Commerce. He is one of the most distinguished railroad lawyers in England and has had a unique experience in rate controversies. According to him "the feeble attempts at regulation which have been made from 1854 down to 1897 have failed." Yet "he felt unwilling to say that all means of transport should be in the hands of the state, and he had his suspicions that if they were they might be managed rather with a view to the immediate interests of a party than to the ultimate benefit of the commerce of the country." He suggested, though in a very half-hearted manner, two possible remedies; but neither of them is new as a theory and neither of them is likely to be translated into practical action.

His first suggestion was the limitation of dividends by a sliding scale, such as is commonly in force in England in reference to gas companies. An initial price of gas, say 66 cents per 1,000 cu. ft., is fixed, and a standard dividend, say 7 per cent., is fixed also. For every penny added to the price of gas one-quarter per cent. must come off the shareholders' dividend; and similarly for every penny by which the price of gas is reduced, one-quarter per cent. may be added. Some such method, Mr. Browne thought, might be applied to railroads and their rates. His second suggestion is this: "Short of the acquisition of all the railroads by the state, might not an experiment be made in that regard? It would be easy for the state to purchase certain derelict lines, lines which pay no dividend; and then the public could insist upon their being operated at rates which were reasonable in the interests of the community. In that event state competition would introduce a wholesome element into the railroad world."

Such were Mr. Browne's proposals. But the difficulties in the way of carrying them out were probably felt by him as they are by every other careful student of the subject, for in the conclusion of his address he came down to the safer though less comforting dictum that "it behooved us all to find how in the future railroads are to be regulated." In other words, constant study by every public-spirited citizen is the only rule that has general application. The problem shifts so often, so much depends upon circumstances which refuse to obey when the state or the public attempts to apply its magic wand of theory, so much is uncertain until the effect of the personal equation in a hundred different discussions is understood, that no one has the courage to tackle an intricate rate problem until the need of action has become so imperative that all concerned will see the need of putting up with compromises when nothing better is attainable.

Englishmen, like Americans, seldom look beyond their own country for the lessons of experience. State management of railroads has been tried in this country—as, for instance, the Hoosac Tunnel road in Massachusetts. While the public are more intelligent now than 20 years ago, there is nothing to indicate that state operation would be any more successful now than formerly. England could also learn a profitable lesson from France, which established partial state competition 20 years ago by buying derelict lines.

Limitation of dividends will repress enterprise as surely as a north wind will check the budding of flowers in the early Spring. In so far as it is successful, as applied to gas companies, the result is due to the comparative simplicity of the business as compared with railroading; in other words, to the possibility of getting along without enterprise. The need of freedom of action in the management of a railroad is as much greater than in the manufacture of gas as the number and variety of prices charged by a railroad is greater than the variety charged by a gas company; say a thousand to one. Perhaps this comparison may seem more extravagant in England than it does here, but we feel very sure that the essential remedy for unjust railroad rates is the same there as here—publicity.

#### Imprisonment for Refusing to Work.

We have received the full text of the decision of the Supreme Court of the United States in the case of *Robertson vs. Baldwin*, confirming the constitutionality of the law under which sailors may be imprisoned for refusing to carry out contracts with masters of vessels. This decision is of interest in connection with the discussion of railroadmen's rights, which arises whenever, in the course of a strike among trainmen, a locomotive or train is deserted without notice, especially when such desertion takes place at some point remote from a station.

Robertson and three others contracted to work as sailors on the ship *Arago*, at San Francisco, but be-

came dissatisfied and left the vessel at Astoria. They were arrested and held in jail 16 days, after which they were placed on board the *Arago* against their will. They refused to obey orders, and were again arrested in San Francisco. The case went to the Supreme Court on a writ of habeas corpus. The decision, prepared by Justice Brown, decides two points: First, that Congress has a right to confer jurisdiction, in a case like this, on a justice of the peace appointed by a state; and, second, that the law prescribing imprisonment for deserting seamen is not in conflict with the thirteenth amendment to the Constitution of the United States, which abolishes slavery and involuntary servitude.

This last and principal question depends, says Justice Brown, upon the construction to be given to the term "involuntary servitude." Does the epithet "involuntary" attach to the word "servitude" continuously, and make illegal any service which becomes involuntary at any time during its existence; or does it attach only at the inception of the servitude, and characterize it as unlawful because unlawfully entered into? If the former be the true construction—

"Then no one, not even a soldier, sailor, or apprentice, can surrender his liberty, even for a day; and the soldier may desert his regiment upon the eve of battle, or the sailor abandon his ship at any intermediate port of landing, or even in a storm at sea, provided only he can find means of escaping to another vessel. If the latter, then an individual may, for a valuable consideration, contract for the surrender of his personal liberty for a definite time and for a recognized purpose, and subordinate his going and coming to the will of another during the continuance of the contract—not that all such contracts would be lawful, but that a servitude which was knowingly and willingly entered into could not be termed involuntary."

Justice Brown goes on to quote ancient statutes to show that the contract of a seaman, even if within the letter of the thirteenth amendment, does not, within its spirit, make a case of involuntary servitude. The first 10 amendments to the Constitution were not intended to lay down any novel principles. Freedom of speech was guaranteed, but this does not permit the publication of libels; the right to bear arms was declared, yet we prohibit the carrying of concealed weapons, etc. The thirteenth amendment dealt with slavery in the Southern states; the words "involuntary servitude" were added so as to cover the Chinese coolie trade. This amendment was not intended to introduce any novel doctrine with respect, for instance, to military and naval enlistments. The amendment makes no distinction between a public and a private service. To say that persons engaged in a public service are not within the amendment is to admit that there are exceptions to its general language, and the further question is at once presented, where shall the line be drawn? We know of no better answer to make, says Judge Brown, than to say that services which have from time immemorial been treated as exceptional shall not be regarded as within its purview.

Judge Brown then goes on to show that from the earliest period a sailor making a contract has been held to surrender his personal liberty to a certain extent. Without this, navigation could not be carried on. The sailors might desert at a place where seamen could not be obtained, and "the ship would be left to rot in her neglected brine." The earliest reference made in the decision is to the maritime law of the ancient Rhodians, 900 years before Christ. Henry III. had such a rule, and in 1597 the towns belonging to the Hanseatic League imprisoned a sailor for a year, on bread and water, if he caused damage to a ship by leaving it; and for another phase of the same offense a sailor was condemned to be "stigmatized in the face with the first letter of the name of the town to which he belonged." Louis XIV. had a similar law. The present commercial code of France makes no express provision on the subject, but the German and Dutch laws do. Other modern laws are mentioned, in Europe and South America, though the Spanish code is silent on the subject. The first English statute was in 1729, though Malynes, an English legal writer of 1622, defined substantially the same principle. The statute law (2 Geo. II., chap. 36) empowered justices of the peace to commit deserting seamen to the House of Correction to be confined at hard labor. This seems to have been the basis of our law, which was passed by Congress July 20, 1790. The modern law of England (1854) makes similar provisions. The provision for imprisonment for desertion seems to have been repealed by the Merchants' Seamen Act of 1880; but the tenth section of that act retained the provision authorizing the master to call upon the police officers or constables to convey deserting seamen on board their vessels.

In 1894, however, the whole subject was reconsidered and imprisonment was prescribed, except in cases arising in the United Kingdom. The provision for the arrest of deserters and their conveyance on board the ship is retained both within and without the Kingdom.

The earliest American legislation was by Massachusetts in 1668. Our federal laws contain very careful provisions for the protection of seamen against frauds and cruelty of masters, the devices of boarding-house keepers, and, as far as possible, against the consequences of their own ignorance and improvidence. At the same time discipline is more stringently enforced by additional punishment for desertion, absence without leave, disobedience, insubordination and barratry. Indeed, seamen are treated by Congress, as well as by the Parliament of Great Britain, as "deficient in that full and intelligent responsibility for their acts which is accredited to ordinary adults, and as needing the protection of the law in



the same sense which minors and wards are entitled to the protection of their parents and guardians."

In view of all this, Judge Brown holds that the thirteenth amendment was never intended to apply to seamen's contracts, and the law of 1890 must therefore be enforced.

The substance of the decision, it will be seen, is that the Constitution does not forbid an employee to make a contract giving up his liberty, the assumption being that he does it with his eyes open; and that Congress may, in case of the violation of such a contract by the employee, use force to compel him to fulfill it, because it has always been customary to do so. We say "always" because we assume that previous to 900 B. C. the conditions of a sailor's service were probably harder rather than easier. Technically, this has no effect, one way or the other, on a locomotive engineman's rights in a strike, because his contract generally is of such a loose character that he can back out of it anywhere, or at any time, without doing anything contrary to its terms; but practically it is well to make note of this decision, so as to not forget that, so far as the Constitution is concerned, a law imprisoning an engineman for deserting a train in the woods might be passed any day.

In every prominent strike there have been suggestions that enginemen and other trainmen ought to be enlisted, under military or quasi-military regulations, which means, of course, that they should suffer corporal punishment for desertion. Public opinion has not appeared to favor this proposition, and there is thus far no sign that it ever will favor it; but it will be well for all trainmen to bear in mind that the basis for this public sentiment in their favor is the feeling that every engineman, conductor and brakeman is a man of such strong and upright character that he will carry out all his duties to his employer and to the public, without governmental coercion. The sailor is coerced because, in the language of the Supreme Court, he is like a child, or is otherwise so deficient in intelligence as to need a guardian. The security of the railroad employee lies in his ability to maintain in the eyes of the general public a reputation for doing as he would be done by. It is hardly necessary to say that in some of the brotherhoods there are men who need some education in morals before they will be up to this ethical standard.

The Interstate Commerce Commission has issued an opinion on the violation of the long and short haul law on freight rates to Colorado, by Receiver A. F. Walker, of the Atchison, Topeka & Santa Fe, in October, 1895. It is prepared by Commissioner Prouty, who seems to be the general spokesman of the Commission. The opinion recognizes that the very low tariffs issued in the Colorado rate war of 1895 were soon restored and that the question has ceased to be a live one, but it is deemed proper to express an opinion upon the claim of Mr. Walker that his act was not a violation of the law. He made an open reduction of rates to Denver to meet an alleged secret reduction of a competing line. Rates to intermediate points were not reduced. In 1887 the Commission held that a road might disregard the fourth section when necessary to meet (1) the competition of water lines or (2) that of railroads in foreign countries, or (3) in special and peculiar cases, the competition of any carrier. In a later case, that of the Railroad Commission of Georgia vs. the Clyde Steamship Company, it was held that the "special and peculiar" cases referred to could never justify disregard of the fourth section unless an application were first made to the Commission for relief. Mr. Walker admits the force of the Commission's view in all points, except that he claims that secret reduction of rates by a competitor should be treated the same as the competition of a carrier not within the control of the law, the Commission being unable to discover and punish secret reductions. The present decision denies this claim. It will not do "to leave it to the inner consciousness of each railroad manager to determine for himself whether an essential provision of the law should or should not be observed. We think it accords much better with the intent of the act to hold that application must be made in the first instance to the Commission, which was created for the express purpose of deciding, as an impartial tribunal, upon investigation, whether the facts do actually exist, and, if so, whether they are sufficient to justify the suspension of the rule of the fourth section, and to what extent." The proposition to violate the law because someone else is believed to have secretly violated it "would sound ridiculous if it proceeded from a less eminent authority; it is sufficiently startling from any source. Applied to laws in general it would result in complete anarchy." Commissioner Prouty intimates that if Receiver Walker had complained to the Commission that body probably could have stopped the secret rate cutting, if it existed, and indeed "the very fact of publicity would have gone far toward stopping it; at all events we should not have required Mr. Walker to sacrifice the properties of which he was in charge, but should have permitted him to make rates in disregard of the fourth section if, in our judgment, that was necessary to protect those properties. The decision discusses the reasons why the Interstate Commerce Law has not been enforced, and points out that Mr. Walker is partly responsible for this non-enforcement, because he takes the position (held by most railroad officers) that he ought not to give information against officers of other roads who violate the law. As a legal theory Mr. Prouty's opinion is certainly sound. Whether it could be applied to any given rate-war quickly enough to do justice to the innocent party

is another question. A war can work a good deal of damage in a single week and the ability of the Commission to hustle around and issue a restraining order in that time is yet to be demonstrated. Probably the Commissioners expect that after one conviction, in a case like that which led the Atchison to reduce its tariffs, the lawbreakers would stop their tricks; but the trouble is to find the road that is ready to be the victim of the first crime—the crime that has to be used as an example and the damage of which is never repaired.

Governor Leedy, of Kansas, has vetoed the Harris bill empowering the Railroad Commissioners to fix rates. The reporters say that the Governor wants the Legislature to pass a maximum rate bill, but it is nearly time to adjourn, and no railroad legislation is probable. The next regular session of the legislature comes in 1899. The action of the legislatures of various other States during the past two weeks may be briefly summarized as follows:

The Arkansas bill to establish a railroad commission of three members was passed by the Lower House of the legislature of that state about two weeks ago. When it came to the Senate, it was amended by the addition of a provision that one of the Commissioners (to be appointed by the Governor) should be selected from two candidates named by the railroads of the state, these candidates to have had "five years' experience in railroad rates."

The Indiana Legislature has rejected a bill to make passenger fares two cents a mile. The Lower House has passed a bill reducing street car fares to three cents, but there does not seem to be much prospect of its passage in the Senate.

The Kansas Legislature has passed a bill providing that no judge shall impose a penalty for contempt, exceeding \$50 fine or one day's imprisonment, without the intervention of a jury.

The two-cent fare bill in Missouri has been passed by the Lower House, and the same body has passed a law prohibiting the use of gates on passenger cars.

The New Jersey bill for the establishment of a railroad commission is encountering strong opposition.

The North Dakota Legislature has passed a law empowering the Railroad Commissioners to fix freight rates. There was a proposition to abolish the Railroad Commission, but it was quickly voted down.

A bill for a railroad commission of three members has been introduced in Pennsylvania. In Tennessee a bill of this character failed by two votes.

The South Carolina bill for separate cars for colored passengers has been indefinitely postponed.

The Legislature of Oklahoma has rejected a railroad bill, and this indicates, it is said, that no railroad legislation will be passed this session. The Legislature of Washington has rejected the bill for the creation of a railroad commission, and this, it is said, will destroy the effect of the bill reducing freight rates which was passed some weeks ago.

The committee of the General Passenger and Ticket Agents' Association, which has been trying for two years to make a report on safety paper for tickets, seems to have hard work in bringing its deliberations to a head. The *Official Guide* now says, however, that substantial progress has been made, and the editor seems to hope that some recommendation will be made before long, though nothing is given out to warrant a definite statement on this point. The *Official Guide* calls attention to the desirability of a law to protect tickets, the same as bank notes are now protected; that is, one making it a crime to imitate the paper, or to print counterfeit tickets upon genuine paper, or on any other. While it is desirable that all the railroads in the country shall adopt and use the same kind of paper, so that counterfeits can be more quickly detected, among foreign as well as home tickets, it would seem as though a road had better adopt some kind, and begin to use it, whether its neighbors are willing to join or not. What would be the disadvantage? The fact that it has been so hard to arrange an agreement may possibly be treated as an indication that no equitable recommendation is possible, and that each road ought to act wholly on its own responsibility. A recommendation of some one make of paper would probably incur the odium of favoritism and there would be objectors who would try to find some other paper just because of the alleged wrong of recommending only one kind. The need of providing for competition between manufacturers may or may not be an important factor; nothing has been given out concerning that point. In saying that some kind of paper ought to be put in use without delay we assume that the cost would be not much more than that of papers now used. If it were much greater, the advisability of making a change would be doubtful, for the loss from counterfeit tickets is exceedingly small. It seems likely that this kind of fraud may increase, as rogues grow more numerous and the printer's, photographer's and engraver's arts are simplified, but even if this does occur a large increase could be endured rather than pay much more for paper.

#### NEW PUBLICATIONS.

*Power Distribution for Electric Railroads.* By Louis Bell, Ph. D., New York: Street Railway Publishing Co., pp. 268; 6 x 9 in. Price, \$2.50.

This book deals with the theoretical and practical applications of electricity to street railroads. The author has combined clearness and compactness with a treatment sufficiently full to enable the average student

to obtain for himself a fair knowledge of the subject. The fundamental principles are treated in the opening chapter, and with the knowledge there outlined the remainder of the work will be readily understood even by those who have not previously given the subject a critical study. The few formulae presented in the first part of the work are carefully explained, so that they help rather than hinder the reader. The book answers a long-felt need, and Dr. Bell has furnished a work that will be read with profit by those desiring to give the subject of street railroads a careful study.

The three-wire system of Lugano, the Baldwin-Westinghouse locomotives, the Nantasket Beach electric line and other subjects of equal interest and importance are considered at some length. The book does not confine its treatment to the progress which has been made, but for the large part deals with the work which is now being done in the many departments of street railroads. Numerous diagrams and engravings add much to the value and completeness of the work.

*Municipal Affairs.* A Bibliography of Municipal Administration and City Conditions. By Robert C. Brooks. New York: Reform Club, 52 William street; quarterly. Price \$1 a year, single numbers 25 cents. (This first number 50 cents.)

This first number of a quarterly to be issued by the Reform Club of New York is a pamphlet of 224 octavo pages, consisting entirely of a bibliography of books and articles on matters of municipal organization and conduct. This list contains some 6,000 entries, classified first by topics and second by authors. The author list has 2,300 titles under the names of 1,400 authors. The topical list repeats the titles contained in the author list with sufficient cross-references, and also contains references to 1,000 anonymous works. The attempt has been made to include books, pamphlets and periodical literature of the United States, Great Britain, Germany, France, Italy, Austria and Spain. The more important federal and state documents have been indexed, but formal accounts and routine reports of cities have not been included, except where they contain matters deemed to be specially important. Hereafter the journal will contain studies of municipal government by recognized authorities, and shorter articles dealing with questions of immediate interest, book reviews and other departments suggested by the needs of the time.

*American Society of Railroad Superintendents.*—The proceedings of the 26th meeting, held last September, have been issued by Secretary C. A. Hammond. The report is edited in its usual excellent form. Mr. Hansel's paper on "Signaling" is illustrated by drawings of apparatus and a large diagram of electric circuits used in the National lock and block instruments. The appendix contains a short paper on the "Organization and Management of the State Railroads of India," by Mr. Priestley, District Superintendent on those roads, who is an associate member of the society and who was present at the meeting.

Secretary Hammond has issued a separate pamphlet containing the resolutions on the deaths of John Adams, W. G. Watson and Waterman Stone. This pamphlet contains half-tone portraits of the subjects of the sketches.

#### TRADE CATALOGUES.

*Refrigeration.*—Westinghouse, Kerr & Co. have issued a 23-page catalogue which is in keeping with the high grade of ammonia compressors made by that company. A word of caution to the buyer is given on the first page of the printed matter, which is followed by a careful description of the compressor and condenser. "A bit of information" given on page 13 calls attention to the essentials of high-grade machinery used in refrigeration, and in the article on "Some Principles and Several Facts" the main points to be closely observed in this class of machinery are discussed concisely and clearly. Excellent half-tone engravings occupy more than half of the 6x9 pages and the transparent view of a double ammonia compressor given on page 7 is finely executed, and is worthy of special notice.

#### Railroads in Korea.

(Continued from page 185.)

nish the land for the entire roadbed, including the terminals, but no other land grants will be given. Government mails will be transported free of charge.

Under the authority of Mr. Leigh Hunt, representing the syndicate which holds the concession, a preliminary line was run for this railroad, in May and June, 1896, by Mr. J. H. Dye. With the exception of one large bridge over the Han River, some four miles from Seoul, the road offers no serious difficulty. The country traversed is entirely agricultural, and the towns along the line, therefore, are hardly anything more than groups of houses of farmers. During the rainy season, June, July and August, the Han River, at times, overflows its boundaries in the vicinity of Seoul, and floods a considerable extent of land. The works in this vicinity will, therefore, be rather heavy. Rock suitable for railroad masonry can be obtained without difficulty; but there is absolutely no timber along the whole length of the road. Here in Korea, as in China, the people attach much importance to their cemeteries, and the railroad builders will have trouble in avoiding cemeteries entirely. The gage of the road may be 4 ft. 8½ in., according to a recent Korean law compelling all railroads which shall be built to be of that width, although this edict is *ex post facto*, so far as the Morse Railroad is concerned.



Of all the railroads that might be built in Korea, the Seoul-Chemulpo line would have the best chance of paying. Much of the traffic will be ready for it the day it is opened. Seoul, with its 250,000 or 300,000 inhabitants, consumes a considerable quantity of foreign goods, all of which have to be landed at the thrifty port of Chemulpo, and most of these would probably be brought to Seoul by rail. It is true that the railroad would have to compete with the river traffic; but, considering the fact that by water the distance from Chemulpo to Seoul is about 50 miles, that the river is navigable only at certain stages of the tide and for two or three months in winter river navigation is closed entirely, there is not much doubt that the railroad would get all the passenger traffic and with reasonable rates most of the freight. The supply of rice for Seoul is mostly brought up the river in junks to the river towns, about four miles away, and from there to the city by pack ponies. All this traffic from the river to the city would in time fall to the railroad.

The concession for the Seoul-Chemulpo railroad started the ball rolling; not long after a French syndicate received a concession for a railroad from Seoul to Wi Ju, at the mouth of the Yalu River, the boundary between China and Korea. This concession was granted July 3 and its terms are identical with those of the Seoul-Chemulpo concession, except that three years are allowed in which to begin construction and nine years to finish it. No survey of this line has yet been made, but its length would be approximately 340 miles.

The information concerning this region is such as can be gathered from men who have traveled over the main road between the two termini. But this highway for centuries has been the line of communication between Seoul and the Chinese frontier, and until recently it was traveled over yearly by the Korean embassy, bearing his Majesty's tribute to the Emperor, who made in turn presents, such as silks and the Chinese calendar; and long ago, before the country was opened to foreign commerce, it was constantly used by the Korean traders to carry their produce and wares to the borders, where they were bartered for Chinese goods. In consequence, many of the principal cities between Seoul and Wi Ju, are to be found along this road. A railroad line between these termini, then, would probably be run not very far from the road.

This region like most of Korea is very hilly and several deep cuts would have to be made, and in two or three places tunnels would perhaps have to be made; but none of these tunnels would likely exceed 1,000 to 1,200 ft. in length. The rivers to cross are six in number and would require bridges of considerable length, for even at low water they are several hundred feet wide, while in summer, during the rainy season, they all become much swollen, overflowing the adjacent low plains of sand. Besides these rivers there are about eight streams to cross which in dry weather may be quite insignificant, but become deep and wide rivers when swollen by rains, and would require bridges or trestle work several hundred feet long.

About 20 magistracies or cities would be touched, the six largest, at quite even distances apart, having estimated populations of from ten to sixty thousand. About half way between Seoul and Wi Ju is the city of Pyeng-Yang, where was fought one of the battles of the late China-Japan war. Before the war the population of that place was estimated at 100,000, but it now contains but about one-half of that number, at one time having been nearly entirely depopulated. But the people are gradually returning, so that it is possible Pyeng-Yang will once more take its place as one of the largest cities of Korea. It certainly would also become the principal commercial center of the line, for, although inland some 50 miles, it is situated on a river which is open to navigation for good-sized junks right up to the city, and would thus give the line an outlet to the sea at this point.

The country between Seoul and Wi Ju is mainly agricultural; but it has mineral resources undeveloped. In the vicinity of Pyeng-Yang is a rather friable variety of anthracite coal, which gives but little ash or smoke. Whether it would be utilizable by the railroad has not yet been fully determined, for only the surface coal has been tested; so far this has at least proved to be valuable as a stove fuel. In the province north of Pyeng-Yang gold is found with great frequency, and is worked in a crude way by the Koreans. Here is situated the mine for which Mr. James R. Morse obtained the concession, and which is at present worked under the superintendence of several American engineers. In the immediate vicinity of the highway there is very little timber, but in the North, in the mountains some miles away, large forests are reported to exist.

It would seem that this railroad would become of considerable benefit to a large portion of Korea, mainly by helping to develop the regions through which it would pass; but how soon it would become a paying investment from a commercial point of view it is hard to divine.

The Japanese for several months past have made strenuous efforts to obtain a concession for a road from Seoul to Fusan, but the Korean cabinet have finally and definitely declined to grant this.

The length of a fairly direct Seoul-Fusan line would be about 340 miles. The country is fairly well settled the land fertile, considerable produce being exported Fusan, at which place also all of the foreign supplies for the southeastern provinces enter. In fact, Fusan was the first part open to foreign commerce, its nearness to

Japan making it most convenient for that trade. A line between these termini which would be much more apt to become a commercial success would be deviated to the West from this direct route a considerable amount, and would run through the southwestern provinces—through Chhung Chhong Do, the most thickly settled, and through Challo Do, the "Garden of Korea," as it is called, the most of fertile province in the whole country. It is from the very bountiful crops of the latter that the main supply of rice for Seoul is obtained, as is also most of the rice that is exported from the country; and the traffic on such a line might in time become considerable. By such a deviation the line would be lengthened perhaps 70 or 80 miles. Along these lines also would be found very little timber, the hills and mountains having long ago been practically denuded.

Other railroad concessions have been sought recently by different parties, the French especially making strong efforts to get lines from Seoul to Wousan, on the Eastern Coast, and from Seoul to Mok-Po, at the southwestern end of the Peninsula, a part which has never been opened. The line from Seoul to Wousan would hardly be useful. It is imagined that those after this concession wish it rather to hold than to use. The line to Mok-Po, however, might well be thought of, provided that it were built *instead* of the Fusan line and not in opposition to it.

The French also desire a line from Wousan to the Russian border. Anticipating that such a line would be refused them they urge that at least they should be given a charter for a line along the Yalu River, from Wi Ju to the Russian frontier. Neither of these lines would be of any other use at present than to give the Russians an outlet for their goods in Korea. It is true that at Wousan the former line would also give the Russians an open sea in winter. Port Lazaref, the bugbear for the last ten years of the English newspapers, is only a few miles north of Wousan. But a Russian officer who surveyed this port some years ago reported unfavorably of it as a winter rendezvous for their fleet. However, the conditions have suddenly changed; the Russians do not seem to need an open port in this vicinity as much as they did, and in the future we shall perhaps hear less about this matter. A Russian company secured a charter on Sept. 9 to engage in cutting the timber in the eastern and northeastern provinces of the country, and that along the Yalu river. These two railroads would pass through or near a large portion of this timber land, considering which, and the fact that the mountains of this region are also very rich in minerals, such as gold, silver, copper, graphite, etc., they would help to develop this section of the country to some extent, but not for a moment would they be considered as a profitable investment.

The lines that have already been described would be the main arteries of any system of railroads in Korea which may be built in the future. Their commercial value has already been stated; but their strategic importance yet remains to be mentioned.

As the capital of Korea and as the center of all the most important lines of communication Seoul is a strategic point. It is at the head of navigation of the River Han, up which the American fleet ascended in 1871 to obtain redress for the destruction of the General Sherman at Pyeng-Yang, and in case hostilities should be begun against Korea, it would be the principal point toward which the enemy's operations would be directed. In the present financial condition of Korea it cannot be supposed that she would be able to defend herself single-handed, nor is she likely to be called upon to do so, her geographical position making it more than probable that she would always find an ally in some one of the three most interested nations, Russia, China or Japan. Railroads, then, at the present time could hardly be counted as of much strategic value to the Korean government itself, while to the near-by nations, who may control them, they would mean a great deal.

The Seoul-Wi Ju line would connect the strategic points of Seoul, Pyeng-Yang and Wi-Ju, thus running along the geographic strategic line often used by the Chinese, especially three centuries ago, when she came to the relief of Korea, then invaded by the Japanese, and used by the Japanese to assail China in their recent contest. The Seoul-Wi Ju Railroad would, of course, in time, connect with the Manchurian branch of the Trans-Siberian Railway, at present projected to the Liantong Peninsula, and would then become especially valuable to the Russians, for I assume that the French will merely hold this line and any other lines they may build in trust for Russia.

The Seoul-Fusan line would mean as much to the Japanese as would the Seoul-Wi Ju line to the Russians, for along these two lines would these powers most likely approach each other in a military attack. The reasons are very obvious, then, for the determined endeavors of the Japanese to obtain the concession for this line. Such a line in their hands would help them to a considerable extent to regain the semblance of a hold in a country where at present they have practically none at all. Fusan is by far the best place for the Japanese to land troops for a campaign in Korea, being only about 40 miles from the nearest point of the Japanese island Tsushima. These could be sent to Korea, via Fusan, with comparative security, while an attempt to land them at Chemulpo, or at some other of the more distant ports, might be disastrous to them had they to act in the presence of an enemy's navy. It may be remarked that the Fusan route was the one actually traveled by the Japanese when they landed for their cam-

paign in Korea three centuries ago. The Seoul-Wousan line, as already suggested, might be useful in an emergency to give quick communication from the capital to the eastern coast; while the Seoul-Mok Po line would also be useful to concentrate troops on the southwestern coast, and in the absence of the Fusan line would be of much value to the Japanese. As for the other lines mentioned, that from Wousan to the Russian frontier, and that along the Yalu River, they would not for a moment be considered strategically by Korea under present conditions.

Most of the lumber for construction would have to be brought from a distance, making all wooden structures expensive. For the Tien Tsin Railroad the lumber was secured in Oregon, Vladivostok and Japan.

Cross ties for a standard-gage railroad can be laid down in Chemulpo for about 72 cents Mexican for pine, 90 cents Mexican for chestnut, and \$1 Mexican for oak. Lumber for other purposes is proportionately as high, the prices varying for different kinds of timber and different dimensions, from about \$25 to \$40 per 1,000 ft. board measure. These, when compared with American prices, are seen to be quite high, for it must be remembered that one dollar Mexican should buy at least as much here, of native produce, as will \$1 gold in the United States or similar goods there. But labor is very cheap. Common coolies in Seoul, when working for the government this past summer, received 20 cents silver for a day's work of about ten hours. In private work they are paid more, 21 and 28 cents being their common prices. Carpenters, masons, stonecutters and plasterers all receive about 50 cents Mexican for 10 hours' work. These prices, though, are not as low as they would appear to be, for workmen here do not accomplish in a day as much as do American workmen, nor is the quality of their work as good.

That railroad ventures in Korea may in time prove to be profitable is only a conjecture, but sooner or later she is bound to admit foreign industries and methods, and railroads then will become a necessity. Now those on the grounds are anxiously waiting to see what it is to come from such railroad negotiations as have already been made and those that are now pending. In every case, it is safe to say, the good will and good wishes of the whole foreign community of Korea would go to any and all of those who have such enterprises in view.

Since writing the above, I learn that two edicts were issued by the King on Nov. 16. One is that the gage of the railroads of the country shall be five English feet (instead of the 4 ft. 8½ in. standard gage, already announced). This edict, though, cannot affect either the Seoul-Chemulpo or the Seoul-Wi Ju railroads. The other edict announces, that in consequence of the great cost to the government of obtaining the right of way through the lands of the country people, no more railroad concessions will be granted by the government during the period of one year beginning with the day of the issuance of the decree.

J. HENRY DYE.

IN THE FIELD, Korea, Nov. 22, 1896.

#### Danish State Railroads.

The statistics of the Danish state railroads for last year have been published. What is the most striking in it to an American at the first glance is the witness it bears to the solid regularity of Danish life. The average traveling distance is exactly the same as in the preceding year, namely 15½ miles; out of every 1,000 tickets 214 were single-trip and 786 round-trip tickets, precisely as in 1895; and out of every 1,000 tickets 134 were first and second class and 866 third class, while the corresponding figures for 1895 were 133 and 867. This does not, however, exclude progress, only the progress is of the steady nature which runs counter to speculative gain. In the following tables 1 krone is calculated as \$0.258 and 1 Danish mile equals 4 American miles:

	1895.	1896.
Income.....	\$5,018,316	\$5,501,256
Operating expenses.....	4,904,312	4,107,368
Net earnings.....	\$1,014,004	\$1,393,888
Income per mile.....	\$5.499	\$5.982
Operating expenses per mile.....	4.359	4.106
Net per mile.....	\$1.140	\$1.876
Income per train mile.....	\$1.27½	\$1.35
Operating expenses per train mile.....	1.1	1.05½
Net.....	\$ .26½	\$ .34½
Freight income per mile.....	\$2.057	\$2.290½
Cost of rails per ton.....	23.20	23.65
Cost of coal per ton (2,000 lbs.).....	3.80	3.47½

The annual freight is only slightly more than 2,000,000 tons, but during the last eight years it has risen from 861 to 1,294 tons per kilometer, the corresponding figure for the Swedish state railroads being 1,237 (in 1895), while for roads under private management it occasionally reaches between 8,000 and 9,000 tons. A contrast so striking cannot, however, be used unqualifiedly as an argument against public ownership for the simple reason that the private railroad, of course, aims at nothing else than directly paying business, but the government is prompted by other motives also. It is interesting to see what the Danish government has achieved in this direction because the lessons that governmental paternalism in this department can teach generally in other countries are obscured by military considerations, but are taught without such in Denmark.

Especially the western portion of Jutland is covered with heaths and sand, but experiments had shown that the soil could be improved with no greater outlay of



work and money than would prove a paying investment in the long run. The government determined to connect these sections by rail with the fertile and largely populated parts. Such a venture could not pay at first; it does not pay even now by any means. While the roads planned for mere direct profit give between \$4,500 and \$7,500 income per mile, the "pioneer" branches, or two-fifths of the whole system, yield no more than \$1,900 per mile, notwithstanding a large and steady increase of business on these lines. This progress may continue until the investment finally proves directly profitable; but, even if that should never be the case, the venture has been attended with success, viewed from the statesman's standpoint. There are hundreds of dairy farms now where formerly there was not a single one; out of the relatively large waste area in the past there is hardly left any. The railroad has called into life the enterprise which has changed barren land to agricultural soil, and this result is vastly more valuable than the amount of interest of money invested in such roads.

Another point which shows the government's paternal care in a favorable light refers to the rates. These have been so reduced that the capital invested, about fifty million dollars, gives only 2 or 2½ per cent. a year. The following table shows the freight per ton-mile (1 ton = 2,000 lbs.), figured out according to the actual rates, on shipments of meat and pork:

	Lbs.	Denmark.	Sweden.	Germany.
If sent 58½ miles and in quantities of....	220	3½c.	4½c.	4½c.
	551	2½c.	4½c.	4½c.
	22,048 (car)	1½c.	3½c.	2½c.
If sent 207 miles and in quantities of....	220	1½c.	3½c.	4c.
	551	1½c.	3½c.	4c.
	22,048 (car)	0 95c.	2½c.	2½c.

The total number of miles of state railroads is 1,073 with

coupling by a smaller link which hangs on a finger on the drawhead. The jar of coupling throws the suspension link off the finger.

Another modification is shown in Fig. 2. There is a roller having trunnions which run in inclined slots in the drawhead. In setting the coupling, the pin is raised, and the roller runs down under it and supports it. In the drawhead having the link, the roller rests on the link and holds its outer end horizontal. As the link enters the opposite drawhead, it forces the roller back, allowing the pin to drop. Another means of supporting the pin is shown in Fig. 3.

A numerous class retains the old link, but substitutes a pin which can swing as well as rise. This form is shown in Fig. 4. The pin is provided with a spherical head. To set the coupler not to couple, the pin is raised and tilted to the rear till it jams in the upper opening and remains elevated.

Instead of the swinging pin, a barbed head has been used to hold the link in the drawhead. Fig. 5 illustrates an example of this. A head is pivoted in a slot in the drawhead. At its forward end the head carries a hook. In coupling the link engages the inclined edge of the hook and rides under it, after which the hook drops into the link. For uncoupling the head has a projection above the trunnions which is engaged by an arm on a shaft running across the end of the car.

In Fig. 6 is illustrated the form of fastening for the link known as "rolling detent." A starwheel is pivoted in a slot open on the upper side of the drawhead. It is always free to turn backward, speaking of its under portion, but is prevented from turning forward by a pawl lever. The pawl lever is balanced by a weight on its rear end and has a lug which engages a flat spring secured to the drawhead. The action of the lug and

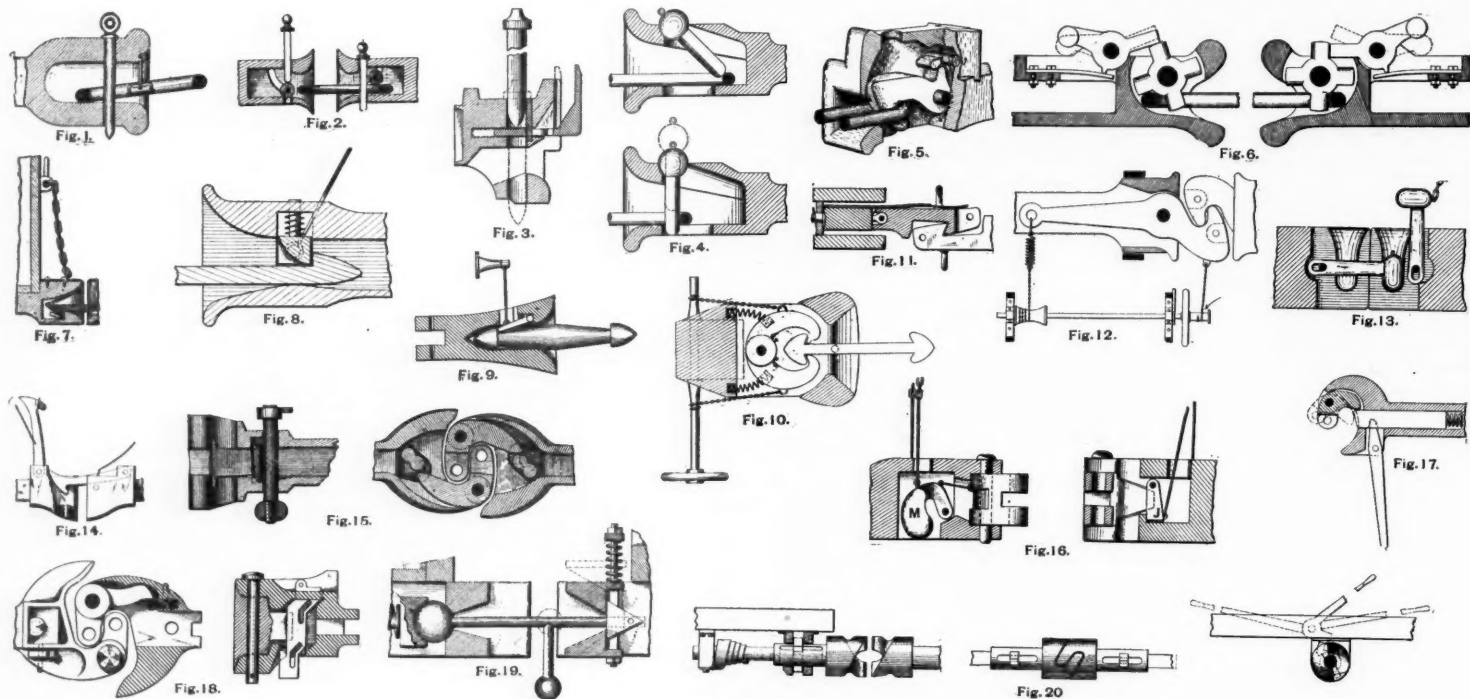
hook. The heads of the hooks are beveled so that they spring past each other in coupling. To uncouple, a lever on the car is drawn over and caught. The head of the coupler hook is slotted for a link.

The coupler illustrated in Fig. 12 is of the "twin jaw" type, which somewhat resembles the "Miller Hook." A lever is pivoted to move horizontally in a slot in the drawhead, its outer end being hooked and beveled. Its rear end carries an eye to which a spring is attached, the other end of the spring being hooked into a chain coiled on a drum on a shaft mounted on the car. The outer end of the shaft also has a drum from which a chain runs to a lug on the outer end of the lever. By turning the shaft one way the rear chain is wound up and the spring put under tension. When the shaft is turned the other way the forward chain draws the hook out of engagement.

In Fig. 13 is illustrated a coupler in which a headed link is pivoted in a vertical slot in the drawhead and in which the slot is widened near the center from the upper face of the drawhead nearly to the under side.

In Fig. 14 also the drawhead is slotted vertically and has a movable member pivoted in the slot; but, instead of an enlarged head, the link has a hook which engages a bolt which spans the slot in the drawhead. The head of the link is beveled so that it will rise over the bolt in the opposite drawhead. The link to be used is supported in horizontal position by resting on the bolt in its own drawhead.

A modification of the well-known "Janney" type is shown in Fig. 15. A tail-piece extends back into the drawhead from the knuckle, and the coupler is locked by a horizontal pivoted latch consisting of a vertical pin having an integral wing which can be turned toward the knuckle and past the tail piece, and then strikes the



Some of the Curiosities of the Car Coupler.

308 locomotives, 6,000 cars, and 26 steamers and ferries. When there is a dearth of cars and the department does not see fit to purchase what is needed, arrangements are made with foreign, especially German, railroads, for a temporary loan of cars. A sight which the average tourist does not expect to find is the presence in Copenhagen of, for instance, a carload of Turkish prunes in a Turkish freight car.

The greatest speed is hardly over 20 miles an hour; to this corresponds the absence, practically, of accidents. The roadbeds are kept as carefully and neatly as the paths in Central Park.

#### Some of the Curiosities of the Car Coupler.

We are reliably informed that the records of the United States Patent Office show that the efforts of inventors to produce a car coupler have expressed themselves in more than 6,500 different forms. A collection of only 20 of these forms, each one of which represents a type or sub-type, comprising in some cases hundreds of couplers, has been prepared for us, and it seems to have considerable interest, although the events of the last few years have very much narrowed this field for inventors. We think that it is safe to say that of the 20 couplers shown here none have ever been really used, and few have been even tried, full size, on actual cars. A good many of them, in fact, could not possibly have been worked an hour in railroad service, but a few of them show a fair conception of the difficulties to be met. We judge that the collection will have a curious interest for a good many readers, and hope that the publication of it may prevent some waste of energy in the future.

The best-known coupler is the old link-and-pin form, a modified example of which is shown in Fig. 1. This particular form provides for supporting the link before

spring is to keep the lever with its pawl end either raised or depressed.

The old open link has been varied by a solid bar having beveled ends, forming shoulders back of them, as can be seen in Fig. 7. The drawheads are cut away back of the flaring entrance to form catches for the shoulders on the link. Leaf springs secured to the drawhead force the link down on the catches. A rock-shaft is journaled in the drawhead, and has one arm inside to engage the link and raise it above the level of the catch and another arm outside to which a chain is attached for convenience in operating.

Instead of the fixed catch in the drawhead, a sliding catch, shown in Fig. 8, is frequently used by the inventor. A horizontal bar lies across the drawhead in a vertical slot. It is depressed by coiled springs surrounding pins on the bar. The bar is beveled to allow the link-head to pass under it. A bail is attached to the ends of the bar to raise it to release the link.

A form similar to the flat, beveled link is a round bolt with conical heads, Fig. 9. This bolt is held in the coupler by a latch pivoted in the drawhead and depressed by a spring. A link runs from the latch to a rock-shaft so that it can be manipulated from the side of the car.

The single-pivoted catch last described is replaced in another class of couplings by two oppositely turned catches forced toward each other by springs as shown in Fig. 10. These catches turn on a vertical pin in the drawhead, and engage the dart-shaped end of the link. From the catches, chains run to a shaft on the end of the car. By turning the shaft, the chains are wound up and the catches drawn away from each other.

A coupling of the well-known "Miller Hook" family is illustrated in Fig. 11. Each drawhead has a hook pivoted horizontally to it, and a leaf spring on the drawhead presses the spring in the direction of the bill of the

side of the recess and can go no farther. As the tail-piece cannot pass the wing, it is locked and holds the knuckle in coupled position; but, on turning the wing back out of the way of the tail-piece, the knuckle is free to uncouple.

There are several types of locking devices for the Janney coupling, the knuckle and its tail piece remaining substantially the same with them all. The locking was done in the coupler shown in Fig. 15 by a horizontal pivoted latch. In the coupling illustrated in Fig. 16, a pivoted vertical latch is used. The latch-block *J* swings vertically, and is drawn up to a horizontal position to remove it from the path of the tail-piece. The particular coupling shown is also provided with a pivoted weight or counterpoise *M*, which is connected by a link to the knuckle, so that the weight of the counterpoise will always tend to turn the knuckle out into coupling position. Another type of locking device for the tail piece of the knuckle is shown in Fig. 17. Here a horizontally sliding latch engages the tail-piece of the knuckle, and to uncouple, the latch is forced back by a hand lever.

A large class of the Janney couplings is provided with a vertically sliding latch, as shown in Fig. 18. This latch has two angular slots, which are engaged by two pins secured in the drawhead, the result being that the link slides forward into the path of the tail-piece as it slides downward, and that it is retracted from engagement with the tail-piece as it is raised. The latch also has a cam surface, which engages a similar surface on the tail-piece, and thus it throws the knuckle open as it is raised.

A very peculiar type of coupler is illustrated in Fig. 19. The coupling-bar has a ball on one end, which is pressed against its seat in the drawhead by a spring. The other end of the coupling-bar has an arrow-head, which is forced between the beveled faces of the two jaws of the opposite drawhead, the upper one being



vertically movable, or it is turned horizontally so that it may enter without raising the movable jaw. The coupling-bar carries a weighted arm to keep the arrow-head at right angles to the opening between the jaws.

In Fig. 20 is shown a coupling of the type known as "rotary head." The drawhead is mounted on a drawbar which is attached to the car-body by a spiral spring, the drawhead having a shank into which the drawbar loosely fits. A pin having a pointed head passes through a longitudinal slot in the drawhead and through the drawbar, and thus connects them. A hand lever with a lug for engaging the head of the pin is used to lock the drawbar and drawhead from rotation when desired. The drawhead carries two spiral projections, and when the cars come together, these projections turn themselves into the spaces between the similar projections on the opposite drawhead, the head on the pin rides under the lug on the hand lever, and the coupling is complete. On releasing the hand lever, the spiral springs unwind the projections on the drawheads from each other and uncouple the cars.

#### The Transverse Strength of Chilled Iron.

A paper was read by Asa W. Whitney before the Foundrymen's Association of Philadelphia, Jan. 6, on "The Transverse Strength of Chilled Iron as Affected by the Relative Directions of Stress and Chill." A table was given, compiled from tests made by the author in March and September, 1896, and the results obtained by those tests are treated at some length.

The author states that though the report deals with but a small number of test bars, none of which were analyzed, those bars were practically of the same general class of material—cast iron suitable for good car wheels—and that from long experience with chemical and physical tests of cast iron, and particularly from the calculated chemical composition of the cupola charge, he is certain that even the considerable differences shown between the iron from different makers are not in kind of metal, but merely in degree of quality of the same kind. The wide difference shown in strength and resilience between duplicates or similar bars of chilled iron broken in one case by the stress at right angles to lines of chill, and in the other by a stress in the same direction, as the lines of chill is therefore mainly, if not wholly, due to the relative directions of stress and chill. The word "chill" in this paper is taken as meaning "the direction of the most rapid dissipation of heat."

The transverse strength is represented by the modulus of rupture. Professor Johnson's formula is used. For any bar of rectangular cross-section the formula is  $\frac{3}{2} \times \frac{Wl}{bd^2}$

equals the modulus of rupture. Here  $W$  = stress;  $l$ , length;  $b$ , breadth, and  $d$ , depth of test bar.

Some of these bars were rumbled to see whether in such hard white castings any change in strength would result, but it was found that this iron is little affected, if at all. Another point of interest is the fact that it has proved possible to cast a high chilling iron in such form as to have nearly or quite the same modulus of rupture whether cast in sand, so as to be just totally gray or cast of the same volume between chills or iron sides of mold, giving a test bar of less depth with same volume so as to be totally white.

In March, 1891, daily tests of the transverse strength of the chilled wheel metal were adopted. The bars were cast 2 in. square  $\times$  15 in. long and were chilled on the four sides. Thus the meeting of the crystals or lines of chill formed a more or less distinct pair of diagonals. In high chilling iron, particularly the square bar of 4 sq. in., the section of area cast in sand was found very unreliable as an aid to the development of the chemical method of iron mixing. This trouble was obviated by adopting a hexagonal cross-section of 4 sq. in. area. By keeping the same area of cross-section as before, but obtained by the depth  $1\frac{1}{2}$  in. and width  $2\frac{3}{4}$  in., a solid white bar results even with comparatively low chilling iron. The wide sides of this bar only were cast against a chiller, the others being in contact with sand. The lines of chill met end to end from opposite sides, the meeting line being at the neutral axis of the bar. Contraction was measured from small lugs cast on a corner of the hexagon gray bar and on the narrow side of the rectangular chilled bar.

Tests were also made with  $1\frac{1}{2}$ -in. square bars cast in the same mold as the regular flat chilled bars. These bars when strained across the chill were found to break at 4,000 to 6,000 lbs.; while those broken by a stress in the direction of chill required 9,000 to 11,000 lbs. If the regular flat bar were broken by placing it edgewise it would not stand over 16,000 lbs. Some rather imperfect tests of the crushing strength of such chilled iron show 150,000 to over 200,000 lbs. per square inch in the weak way. The author states that the strength in the strong way was not tested, but is probably over 300,000 lbs. The tensile strength tests in the weak way agree with a rough calculation from the transverse strength in the weak way, being 13,000 to 18,000 lbs. per square inch. In the strong way the tensile strength is probably not less than 25,000 lbs.

The average results as given in the table, from  $1\frac{1}{2} \times 1\frac{1}{2}$  in. and  $1\frac{1}{2} \times 2\frac{3}{4}$  in. bars tested in the strong position, showed a modulus of rupture, or relative transverse strength of 48,000, and a resilience in inch pounds per pound of metal, of 48 l. Duplicate specimens tested in the weak way showed a modulus of rupture of 27,140 and a resilience of 16.6.

These tests were all made on average specimens of wheel mixtures, those used first being from A. Whitney & Sons. But some were afterward obtained from another maker. The object was to prove the same phenomena in metal cast in the same manner in the same molds under other conditions of mixture and cupola practice, but well within the range of good wheel metal.

An accurate comparison of the relative merits of the old and the new way of making up cast-iron mixtures only be made by taking other tests and expense into account for a year or more. That comparison has, however, been made by the author and shows for itself a large balance both physically and economically in favor of the new way.

In the discussion, Mr. Schumann spoke as follows: "The paper is of great value. It throws light upon a subject in the foundry business such as we have never had before. The information imparted is entirely new and will open up an opportunity for progress in our business, which will be very material indeed. If I had had the information Mr. Whitney has given us when I was preparing the paper I read recently before the American Society of Mechanical Engineers, my paper would have been far more interesting and exhaustive. I looked in all the foreign publications, but could find no data like what Mr. Whitney has given us this evening. A trouble with foundries is the variable contraction of castings. For instance, in making car wheels, many of us know what trouble has been caused when the chilling was a little in excess of what it should be, and car wheels in consequence would not stand. The information we have before us requires careful study, and we may, perhaps, think it does not have any particular bearing on castings, but probably something may grow out of it through direct application."

#### TECHNICAL.

##### Manufacturing and Business.

The Pyle-National Electric Headlight Co., 1426 Monadnock Block, Chicago, reports a steady increase in business. Shipments of electric headlights for locomotives have just been made to the Chicago, Rock Island & Pacific, Florida Central & Peninsular, Houston & Texas Central, and Rome, Watertown & Ogdensburg railroads.

A. L. Barnet, Geo. J. Atkins and Geo. N. Sceets are mentioned as incorporators of the National Railway Specialty Co., of Chicago. The capital stock is \$250,000.

Edward N. Hurley, who for the past six years has been the Western Agent of the United States Metallic Packing Company, with offices at 1003 Marquette Building, Chicago, has been made General Agent of the same company, with headquarters at Philadelphia and Chicago. Thomas R. Hill has resigned as Superintendent of the company.

At a meeting of the trustees of the Schenectady Locomotive Works at Schenectady, N. Y., March 6, William D. Ellis was elected President to succeed his brother, Edward Ellis, whose death was noted in our last issue. Albert J. Pitkin, formerly Superintendent, becomes Vice-President and General Manager, and A. M. White succeeds Mr. Pitkin.

The Carman-Thompson Co., of Lewiston, Me., which is furnishing an electric power plant for the New York, New Haven & Hartford Railroad at Berlin, Conn., and which furnished the plants for that road at Stamford, Conn., and Nantasket, Mass., has just finished an electric power plant for the Brockton Street Railway Co., of Brockton, Mass., and also one for the St. Johns Street Railroad, of St. Johns, N. S.

The Netherlands Railway Equipment & Navigation Co. of Holland, which furnishes a large part of the railroad equipment for the Dutch Government, has placed an order with the Davis & Egan Machine Tool Co. of Cincinnati, O., for several large lathes and a special heavy screw machine and turret lathe for use in making air brakes.

The plant of the J. H. McEwen Mfg. Co., at Ridgeway, Pa., which was sold by the assignees Feb. 24 to Perry R. Smith and H. S. Thayer, of Ridgeway, for \$120,650, will hereafter be operated as the Ridgeway Dynamo & Engine Works.

The Pennsylvania Bolt & Nut Co., of Lebanon, Pa., has purchased additional property near its works and will erect a new office building.

E. G. Spillsbury, for 10 years Managing Director of the Trenton Iron Co., and Charles W. Roepper, formerly General Manager of the Solid Steel Casting Co., of Alliance, O., have formed the E. J. Spillsbury Engineering Co., with offices at 45 Broadway, New York City. Associated with him is Dr. J. W. Richards, Ph. D. They will carry on a general engineering business. Mr. Spillsbury has, for the last 25 years, been intimately connected with the development of wire rope tramways and underground haulage of every kind, and he is acquainted with the details of the manufacture of steel and wire ropes, with tempering and special treatment of the highest grades of material, and with rolling mills, both for hot and cold rolling. Mr. Roepper has had considerable experience in the manufacture of steel including Bessemer, open hearth and crucible. They are the sole representatives in this country of the Kiedler & Stumpf patents, for pumping engines and air compressors.

The business of the Berlin Iron Bridge Co. has increased to such an extent that Charles M. Jarvis, who

has been Chief Engineer of the company since its organization, has been obliged to resign that office and give his entire time and attention to the business management of the corporation, of which he is President. The Directors have appointed Jas. H. Edwards, a graduate of Cornell University, and who has been with the company a number of years as Chief Assistant to Mr. Jarvis, Chief Engineer. The company has been awarded a contract for furnishing the skeleton steel-work of the building and the roofs for the power station of La Capital Co., of Buenos Ayres, Argentine Republic, South America. The La Capital Co. has also awarded contracts for the erection and equipment of the power station and for the roadbed and cars to parties in the United States. The roof over the engine and dynamo room will be covered with corrugated iron lined with the Berlin Co.'s fireproof anti-condensation roofing lining.

The Leechburg, Pa., Foundry & Machine Co. are building a \$50,000 addition to their plant to accommodate their growing roll trade. Two new furnaces, several ovens and an addition to the roll-turning department, will comprise the features of the improvement. The firm has orders for some months ahead.

##### Iron and Steel.

The annual report of the Pennsylvania Steel Company was issued on March 2 by President E. C. Felton. The net earnings of the year's operations at the Steelton (Pa.) plant show a loss of \$113,309 after charging to operating expenses \$194,001 spent in improvements. The total sales and deliveries were \$5,865,933 as compared with \$6,679,952 in 1895. The total output of steel rails was 68,700 tons as against 122,000 tons in 1895.

Five of the finishing mills and two of the puddling mills of the Brown-Bonell Co., at Youngstown, O., have recently resumed operations.

The Sloss Iron and Steel Co., of Birmingham, Ala., is making general improvements to its No. 2 and No. 3 furnaces.

The Spang Iron and Steel Company, of Sharpsburg, Pa., has started its blooming mill and open-hearth furnace, after an idleness of nearly two months.

##### New Stations and Shops.

The contract for the new grain elevator on the Anchor Line docks at Erie, Pa., has been awarded to Constable Brothers, of Erie. The building is to have a capacity for 600,000 bu. of grain.

The St. Louis *Globe-Democrat* states that the Missouri, Kansas & Texas has accepted the offer of the committee of citizens of Sedalia, Mo., of \$100,000 to be used in the repair and enlargement of the car shops of the company in that city. A piece of land, about 30 acres in extent, has been donated to the road by the city of Sedalia.

Since acquiring control of the Augusta Southern, the South Carolina & Georgia has decided to build a large brick and stone freight depot and warehouse at Augusta, Ga.

The Burlington & Missouri River has begun work on the construction of its new passenger station at Omaha. The plans of the new building have not yet been made public. Temporary terminal facilities for all the railroads which now enter the depot at Tenth and Mason streets are being built.

The Jacksonville Terminal Co. has just opened its new station at Jacksonville, Fla. The building is of brick, with a cement covering and measures 160  $\times$  360 ft., having a total floor space of about 70,000 sq. ft. The contract for the building was given to S. S. Leonard, of Pensacola, and its approximate cost, exclusive of foundations, was \$60,000. The passenger train shed is 1,050 ft. long, and has two different cross sections. The widest of these is 139 ft. 10 in. between outer posts, and covers 9 tracks. The other section is 69 ft. 10 in. wide between outer posts, and covers 4 tracks. The Knoxville Building & Construction Co. was the contractor for the train shed. The architect was Mr. W. B. W. Howe.

##### The Brooklyn Bridge.

At a meeting of the trustees of the New York & Brooklyn Bridge, held last Tuesday, the report of the Board of Experts on the question of running trolley cars and elevated railroad cars over that bridge was approved. A committee was directed to communicate with the railroad companies and learn what they are willing to give for the proposed privileges.

The President and Superintendent were authorized to look into and secure the best signaling system for use at each end of the bridge.

A committee was appointed to inquire into the feasibility of an 80-ft. elevator in Rose street for the accommodation of bridge passengers.

##### Standard Height of Drawbars on Freight Cars.

The Interstate Commerce Commission issues the following circular:

Attention having been called to an apparent misunderstanding among many of the carriers engaged in interstate commerce as to the precise meaning of language used by the American Railway Association, acting under authority conferred by Sec. 5 of the act of March 2, 1893, in fixing the standard height of drawbars, and the variations to be allowed therefrom as between empty and loaded cars, the Association has, at the suggestion of the Commission, stated its understanding in regard to the standard height of drawbar required for freight cars of standard gauge roads to be as follows:

"The standard height of drawbars for freight cars measured perpendicular from the level of the tops of rails to center of drawbars is  $34\frac{1}{2}$  in., with no greater variation allowable than 3 in., minimum height  $31\frac{1}{2}$  in.



By center of drawbar is meant the horizontal line through the center of the drawbar shank. Thirty-four and one-half inches is the standard maximum height, from which there can only be a variation of 3 in. downward."

This accords with the interpretation hitherto announced by the Commission, and any departure from this standard is a failure to comply with the law.

#### Electricity in the Moon Run Colliery.

The Moon Run Coal Co., of Moon Run, Pa., is about to install an electric haulage plant in its colliery, and has made a contract with the General Electric Co. for electrical apparatus, to operate a mine road with over 3½ miles of track. The generating station will consist of one 165-K. W. 250 volt generator, directly connected to a Harrisburg Ideal engine 18½ in. stroke by 16 in. diameter. These with the switchboard will be placed in the present power-house, which now contains an air-compressor plant for the operation of some pick machines. The haulage inside the building will be handled by a 10-ton mining locomotive, provided with 40 H.-P. motors. This will haul 40 loaded cars per trip, each loaded car weighing about two and a half tons.

#### Tie Plates.

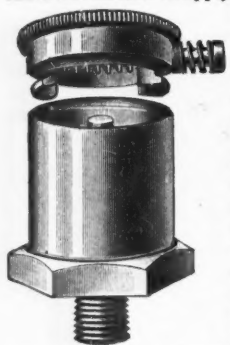
The Railroad Supply Co., makers and sellers of the Wolhaupter tie plate, have taken a license to manufacture and sell under the Servis tie-plate patents, paying royalty therefor. Under this, users and purchasers of the tie plates sold by this company are free from the danger of prosecution for infringement. The following notice has been sent out to railroad companies signed by the Service Tie Plate Co., the Q & C Co. and the Railroad Supply Co.: "Public notice is hereby given that all threatened litigation against the makers and users of the Wolhaupter arch and girder tie plate for infringement of the Servis tie-plate patent has been settled. The Railroad Supply Co. has accepted a license under the Servis patent and has agreed to pay a royalty."

#### A Steel Elevator for the Great Northern.

The Great Northern Railway has arranged to build an elevator at Buffalo, N. Y., the capacity of which is stated at between 2½ and three million bushels. This elevator is to be as near fireproof as possible and it is to be mostly of steel. The bins are to be cylindrical steel tanks 30 or 40 ft. in diameter and 70 ft. or more high. Specifications for the material are out, and it is probable that the contract will be let within a short time.

#### A New Guide and Rod Cap.

The guide cup illustrated herewith, and which was patented, and is for sale by E. L. Enggren, of Ozone Park, N. Y., has several features of interest. The main one is the method of applying and removing the cover.



As will be seen from the cut the cup has an inwardly extending retaining flange, with which a spring actuated catch on the cover engages. The inventor's chief claim of merit is that the cup cannot be broken off, as ones with the screw cover often are from the constant use of a wrench in removing the cover, which, in this cup, is easily taken off by exerting a slight pressure on the spring with the hand. Moreover, it is held perfectly tight, preventing wear and loss of oil; and it cannot be jarred off. Mr. Enggren also makes a rod cup of slightly different shape, wherein the same principle is involved.

#### A New Ferryboat.

A new ferryboat, the Buffalo, for use on the ferries of the West Shore Railroad between New York City and Weehawken, N. J., has been launched at the yards of the Harlan & Hollingsworth Co., Wilmington, Del. The new boat is a side-wheel, beam-engine boat, similar to the large ferryboats now in the service of the road. The principal dimensions are:

Length on water line.....	192 ft.
Length on deck.....	205 ft.
Breadth of hull.....	36 ft.
Breadth over guards.....	65 ft.
Depth of hold.....	13 ft. 9 in.
Engine.....	50-in. cylinder and 10-ft. stroke

#### Preserving Cross Ties in China.

The American Wood Preserving Co., of Philadelphia, Pa., has just received a considerable order for its well-known preservative, Woodiline, from the Imperial North China Railway, of China. The material is to be used on soft wood ties and timbers, and is particularly adapted to such work, owing to its distinct hardening effect on soft woods. The material will be shipped in April.

#### St. Louis Car Coupler Litigation.

The United States Supreme Court has denied the application of the St. Louis Car Coupler Company for a writ of certiorari in the litigation with Shickle, Harrison & Howard, reported in the *Railroad Gazette* of Dec. 11 and subsequent issues. This decision evidently settles the litigation and sustains the right of Shickle, Harrison & Howard to make knuckles and sell them for use in the repair of couplers.

#### THE SCRAP HEAP.

##### Notes.

Union elevator No. 2, at Peoria, Ill., owned by the Chicago, Burlington & Quincy, was burned down March 4; loss, \$350,000.

The Illinois Central has applied for a rehearing before the Louisiana Supreme Court in the matter of the lease of docks at New Orleans.

The Cincinnati, Hamilton & Dayton now issues press tickets—that is, certificates for transportation, such as are issued to editors and publishers—in photographic form; and that is to say, the ticket is good for only one person, and his portrait must appear upon it. The General Passenger Agent charges a dollar for making a half-tone cut from an editor's photograph. For editors blessed with a good many cousins who think it is all right to come to him for the loan of his mileage book, popularly called a "pass," whenever they wish to travel, this kind of ticket must be a boon.

A heavy rain that fell in Central and Southern Indiana, Southern Ohio and Kentucky on March 5 and 6, produced widespread floods, doing damage in hundreds of towns. Press dispatches are, as usual, somewhat vague, but one from Indianapolis states that 113 bridges and trestles in the southern part of Indiana are either destroyed or badly damaged. At Huntington, W. Va., and in Kentucky and Tennessee, much damage was done by wind. The engine-house of the Louisville & Nashville at Rowland, Ky., was badly damaged. All the railroads centering in Cincinnati had to suspend business to some extent on account of submerged tracks and washouts. There was considerable damage in Missouri, and near Stauber, on the Missouri Pacific, a passenger train was wrecked by a landslide, the mail and the baggage cars burned up and two men burned to death. Dispatches from Birmingham, Ala., reported that "in the interior hundreds of bridges" had been washed away.

Reports from St. Paul, March 7, stated that snow in Minnesota and North Dakota was heavier than before for many years. At many places it was reported from 3 ft. to 4 ft. deep on a level. On the Great Northern Railway the rotary snow plows were in many places unable to cope with the snow on account of its great depth.

The Dry Fork Railroad, a line about 30 miles long in the valley of the Cheat River, West Virginia, which was among those damaged by the storm of Feb. 23, reported in our last issue, was completely closed for 12 days, and from the reports published in local papers, it appears that it will not be entirely open for some time longer. This road was badly damaged last July, so much so that it took a month to restore the track, and it said to be in even worse condition now.

#### Gas Explosion in the Boston Subway.

Just before noon of Thursday, March 4, a destructive gas explosion took place at the corner of Tremont and Boylston streets, killing six persons outright and injuring about 40 others, of whom three have since died. Two electric cars, a horse-car and a herdie were wrecked, and the three horses killed and a good deal of damage was done in the vicinity. It was at first thought that the explosion was in the subway itself, but it was found to be due to a collection of gas from a leaky pipe in a large unfilled space between the subway and the temporary wooden flooring of the street. The explosive mixture had probably been ignited by a spark from the motor of one of the cars, which received the full force of the explosion and was almost immediately afterward enveloped in flames. The subway itself was found to be entirely uninjured, with a possibility of some slight abrasion of the exterior coverings.

The responsibility for the accident, according to a statement made by the Mayor, rests between the Boston Gas Light Co. and the Metropolitan Construction Co., who had the contract for this portion of the subway and had not quite finished. The latter company had assumed responsibility for any accidents due to their part in moving the pipes. On the other hand it seems that this leak, or a similar one, had existed as long ago as Dec. 28, and that the gas company had been several times notified, particularly on the morning of the accident, when the smell of gas had become so excessive in the buildings on both sides of the crossing as well as in the street itself, that the patrolman on that corner also notified the gas company. This was about an hour before the accident, and the company states that men were on their way to repair the leak when the explosion occurred. The State Senate has ordered an investigation.

#### Lake Shipping Notes.

The large storage of flour at lake points for shipment after May 1 caused a decrease in the business of the carry-ferry lines operating across Lake Michigan by some 65,000 bbls. in February.

The shipyards of the Globe Iron Works Co. at Cleveland, O., have closed because of a strike, throwing 800 men out of employment. The winter employment of some 30 sailors at vessels about the yards was the direct cause. The company has three large ships under way, one of which was to be launched this month.

#### End of the Ferryboat New Brunswick.

The Pennsylvania Railroad has decided to abandon the remains of the ferryboat New Brunswick, which was burned to the water's edge on Dec. 28 last, selling her for a nominal sum. This ends the career of quite a remarkable boat, twice burned, the first time being on April 17, 1889. At the date she was built she was considered a great advance in ferryboat engineering. She was rebuilt in 1889 after being burned, and was the first of the since very successful double-deck type. Her cabin decorations were considered a marvel in ferryboat architecture.

#### Canada's Mineral Output.

A summary of the mineral production of Canada last year was issued by the Geological Survey Feb. 27, the total value being placed at \$23,627,305, as against \$22,000,000 in 1895. The production of copper was 9,385,556 lbs., \$1,021,148; gold, \$2,810,206; iron ore, 88,206 tons, \$184,913; lead, 24,199,977 lbs., \$721,384; nickel, 3,500,000 lbs., \$1,155,000; silver, 3,205,343 oz., \$2,147,589; coal, 3,743,234 tons, value \$8,006,305, and petroleum, 726,822 bbls., value \$1,155,646. The production of iron ore has fallen off to a considerable extent in all the provinces with the exception of Ontario. The exception is directly due to the erection of blast furnaces in Hamilton, Ont. Ontario's nickel production is reduced during the year by nearly 400,000 lbs., and shows a decreased value of over \$200,000.

#### The Populist and the Laws of the Universe.

A little time ago a bill was introduced into the Indiana Legislature to make the ratio of the circumference of the circle to the diameter 3.2. The Speaker of the House, having been corrupted by a scientific education at the Naval Academy, referred the bill to the Committee on Swamp Lands, but it was subsequently called up and passed the House. We have not learned of its fate in the other branch of the Legislature. The gentleman who asked the famous question "what's abroad to us?" will have to hustle or he will lose his laurels. The Indiana Legislature wants to know what's the universe to us?

#### LOCOMOTIVE BUILDING.

We have been informed that there is no truth in the report that the Boston & Maine has contracted for 25 new engines.

The Manitou & Pike's Peak cog railroad has received a new engine from the Baldwin Locomotive Works. The engine weighs 25 tons and is compound, with cylinders 10 x 15 x 23 in.

#### CAR BUILDING.

The Omaha Packing Co. is asking bids on 100 cars.

The stock cars of the Canadian Pacific Railroad are being rapidly equipped with air-brakes and automatic couplers.

The Cold Blast Transportation Co., of Kansas City, Mo., has placed an order with the Wells & French Co., Chicago, for 100 refrigerator cars.

#### BRIDGE BUILDING.

**Amite City, La.**—Bids for a steel bridge across the Tangipahoa River, at Davis Ferry, have been opened. They are: Groton Bridge Manufacturing Co., \$4,500; Gillet-Herzog Manufacturing Co., \$4,600; Variety Iron Works Co., \$4,900; Southern Bridge Co., \$4,343; Morgan Rhoades Construction Co., \$4,385; Toledo Bridge Co., as per plan on file, \$5,120, as per plan furnished, \$4,856; Milwaukee Bridge & Iron Works, \$4,100; King Bridge Co., \$4,650; Chicago Bridge & Iron Co., \$4,395; Iron Sub-structure Co., \$5,500; Indiana Bridge Co., \$4,600.

**Brooklyn, N. Y.**—The Queens County Board of Assessors has been served with a writ of mandamus, issued by the Supreme Court, directing the board to build a bridge over Newtown Creek at Maspeth avenue. The order gives the Supervisors 30 days in which to commence work, and six months in which to complete it. The expense is to be borne by Kings and Queens counties.

**Cumberland, Md.**—A meeting has been held at this place to discuss the erection of a bridge across the Potomac River at or near Wiley's Ford, connecting the States of Maryland and West Virginia.

**Dauberville, Pa.**—Viewers have examined the site for a bridge over the Schuylkill at this point. The nearest bridges are at Leesport and Mohrsville, two miles apart.

**Hamilton, Ont.**—E. B. Wingate, C. E., of the Toronto, Hamilton & Buffalo, has been instructed to prepare plans for a bridge to be built over the marsh.

**Headtide, Me.**—A second hearing on the question of building a bridge across the cut of the Wiscasset & Quebec at this place will be given by the Board of County Commissioners on March 23.

**New York**—A bill has been introduced in the State Senate providing for the construction of a viaduct across Jerome Park Reservoir, from Jerome avenue to Sedgwick avenue, to be used as a public street.

**Norristown, Pa.**—The Grand Jury has approved of the reports of juries, favoring the building of two county bridges, one in Lower Merion and one in Cheltenham.

**Philadelphia, Pa.**—At the meeting of the Committee on Surveys of City Councils, held March 2, a report was received from the sub-committee on New Bridges, in the form of an ordinance which appropriates \$600,000, to be taken from the \$8,000,000 loan, for new bridges in various parts of the city. The bill authorizes the Director of Public works to contract for the construction of nine new bridges complete, and to commence work on another, 10 in all. These bridges, with the amount of money appropriated for each, are as follows: Thirty-third street bridge over the Philadelphia & Reading and connecting railroads; for retaining walls, abutments and superstructure, \$180,000; new bridge on the line of Lehigh avenue, under the connecting railroad, \$65,000; on the line of Wyoming avenue, over Frankford Creek, \$100,000; Seventeenth street, over the Philadelphia, Germantown & Norristown, \$60,000; Seventy-first street, over the Philadelphia, Wilmington & Baltimore, \$25,000; Sedgely avenue over the Richmond Branch of the Reading, \$40,000; Allegheny avenue, under the North Penn, \$20,000; Dauphin street, under the Connecting Railroad, \$40,000; Fifty-seventh street, over the West Chester & Philadelphia, \$20,000; to commence the construction of a drawbridge over the Schuylkill River, on the line of Passunk avenue, \$50,000. The ordinance also provides that if any of the bridges cost less than the amount set aside for each, the Director of Public Works is authorized to use the balance for the completion of any other bridge for which the sum set aside is insufficient. Chief Webster explained to the committee that plans for bridges had to be prepared with great care and detail and the passage of the ordinance would enable that to be done and perhaps permit the work on the bridges to be commenced during the summer instead of late in the fall.

**Reading, Pa.**—The attention of the Commissioners of Berks County has been called to the fact that a bridge across the Schuylkill River at the foot of Sixth street is needed. It is quite probable that in the course of a few months the matter will assume definite shape. The cost will be about \$150,000.

**St. Louis, Mo.**—The President has signed the bill authorizing the building of a bridge over the Mississippi River at this place. It is said that the bill is in accord with the desire of the projectors of the enterprise in all particulars, except that it specifies that the new bridge cannot be built within three-quarters of a mile of existing bridges.

**Springfield, Mass.**—Citizens of Springfield and West Springfield are getting up a petition to the Commissioners of Hampden County to build a new bridge across the Connecticut River to take the place of the old wooden bridge. The promoters of the proposed Springfield &



Southwestern electric road made a proposition to the County Commissioners to erect a new bridge at this point, and promised a definite sum of money toward it, in return for which they were to have the right of way across the bridge for their cars; but it seems that they have never deposited the money which the Commissioners required before they would issue an order in the premises.

**Victoria, B. C.**—A company has been organized here to build a bridge across the Columbia River, between Robson and Waneta.

**Williamsport, Pa.**—The Phoenix Bridge Co., of Phoenixville, Pa., has just been awarded a contract for five steel viaducts for the Williamsport & Catawissa Division of the Philadelphia & Reading. These new steel trestles will replace old wooden trestles, which at the time they were built were the largest and highest in the country.

The Grand Jury has recommended the erection of an iron bridge over Mosquito Creek on the road leading from Du Bois town to Nisbet at a cost not to exceed \$2,500, as per estimate of County Commissioners.

#### RAILROAD LAW—NOTES OF DECISIONS.

##### Carriage of Goods and Injuries to Property.

The Court of Appeals of Missouri rules that under a contract of shipment of live stock which must also pass over another line, the initial carrier is required to deliver to the connecting line, and, after arrival of the stock at the point of connection, holds it until such delivery as forwarding agent, being liable for the reasonable care of the property while so held. If negligently placed in infected yards, through which the shipper suffers loss, the carrier is liable therefor.<sup>1</sup>

In Illinois the mere convenience of a railroad company is not a sufficient reason for not fencing parts of its depot grounds which are not required to be kept open for the convenience of the public in the use of the road.<sup>2</sup>

In Missouri a railroad is not liable for death of stock from disease contracted from stock which escaped from its cars while being shipped through the state, unless negligence on its part is shown.<sup>3</sup>

In Illinois it is held that when a common carrier is not bound to act in a matter relating to the delivery of goods in accordance with instructions received from the consignor, if he does act, he will be liable for any loss which may occur by reason of his not obeying such instructions.<sup>4</sup>

In Missouri, in an action against a railroad for failure to furnish cars to plaintiff, the latter testified that he ordered three cars from defendant to ship cattle in, that the order was made at 11 o'clock, and the cars were to be ready on the evening of that day. Defendant's agent testified that in the morning plaintiff came to him and said: "I am going for those steers to-day. When can you have a train for me?" That witness replied that No. 94, a loaded train, was due at 1.12. That plaintiff then said: "That will fix me. I want my cattle to get in that train." That at 11 o'clock plaintiff's cattle came in, and he spoke to witness about the train, and asked him what time he would have a train. The Appellate Court rules that the evidence did not tend to show an agreement to furnish three cars to plaintiff.<sup>5</sup>

In Ohio it is held that the statute providing that every railroad shall place on locomotives some contrivance to guard against the emission of sparks, and providing that such device need not be used during the months of December, January and February, do not exempt such railroad company from the exercise of that care which they are always held to in so using their property as not to injure that of others.<sup>6</sup>

In Tennessee where injuries to goods in transit over several connecting lines occur, but the goods reach the last carrier, by reason of a defective car being furnished by a preceding carrier, the last carrier is held not liable therefor.<sup>7</sup>

##### Injuries to Passengers, Employees and Strangers.

In Indiana a passenger who went upon the steps of a railroad train, nearly a quarter of a mile from the place where it was to stop to permit him to alight, could not recover for injuries received by him through being thrown from the step by a sudden jerk of the train, since he was guilty of contributory negligence.<sup>8</sup>

In Missouri plaintiff, who was riding on a box car with his stock, by permission of the railroad company, bent to the caboose about dark, and asked for oil for his lantern, in order to inspect his stock, but as the train was about to start, the conductor told him to come back again the first time the train stopped. At the next stop, it being then quite dark, plaintiff started toward the caboose, feeling his way along with one hand on the cars, and fell into a culvert. The Court of Appeals rules that the company was liable for plaintiff's injuries.<sup>9</sup>

In Michigan a laborer of a section gang, performing labor outside of his employment, the dangers of which are obvious, though such labor was performed under the fear of being discharged if he failed to do so, cannot recover for injuries due to the negligence of his foreman, on the ground that the foreman, in directing a service outside of the scope of the employment, represented the master and the laborer by consenting to perform the work and did not assume the risk.<sup>10</sup>

The Supreme Court of Kansas decides that it is the duty of a railroad to inspect cars owned by or received from another company, which the employees of the former are required to handle or use, where there is time and opportunity to do so; and it will be liable to its employees for injuries resulting from defects in such cars which an ordinary inspection would have discovered. It will not be excused for failure to perform that duty because such cars are only used for a brief time, or carried a short distance; nor will the mere fact that the company is not required to repair such defects relieve it from the obligation to inspect.<sup>11</sup>

The Supreme Court of Pennsylvania rules that in an action for death of a brakeman, killed while on a train, by striking against a cattle chute close to the track, on a siding, the Court, instead of leaving it to the jury, should declare, as matter of law, that he had assumed the risk; it not being disputed that for nearly two months he had passed almost daily, and sometimes several times a day, the point at which the accident occurred, and had taken cars out of the siding before.<sup>12</sup>

In Illinois a railroad employee injured while in an ash pit for the purpose of cleaning cinders from the fire box of an engine cannot recover because of the insufficient depth of the ash pit, since all the dangers arising therefrom are open and obvious.<sup>13</sup>

In Illinois danger from the defective condition of a freight car through the loss of a drawbar is held not to be a risk incident to the business.<sup>14</sup>

In Illinois where there is an increased hazard in the employment of a fireman upon a passenger train, on account of the use of switches without lamps, and the fireman knows that he is exposed to that hazard every time he goes over the road after dark, and makes no objection, it

will be presumed that he assents to it, and that it is one of the risks incident to his employment.<sup>15</sup>

In the same state it is held that an intelligent boy, 16 years of age, who has been employed for several years about the yards and depot of a railroad company as night yard clerk, will be held to have assumed the ordinary hazards of his employment.<sup>16</sup>

In Texas a rule of the company which makes the conductor of a freight train responsible for the brakemen's performance of their duties, requires only that he shall exercise reasonable care and diligence to that end.<sup>17</sup>

In Illinois it is held by the Appellate Court that if an employee is in constant use of an appliance, with an opportunity to know, by the exercise of reasonable diligence, of its defective condition, he is bound to use that diligence, and not use the defective appliance, but report its condition to the company.<sup>18</sup>

In New York one L. was killed by a passing train while he was attempting to cross defendant's track. There was evidence that the accident occurred between daylight and dark, and that smoke from an engine which previously passed obscured the view of the track. Several witnesses testified that no signal on approaching the crossing was given by the train that struck interstate. There was also evidence that L. was obliged to hold a paper within four or five inches of his eyes in order to read; that, in attempting to work in his garden, he would pull up vegetables instead of weeds; and that he had to get very close to his nearest acquaintances to recognize them. The Supreme Court rules that it was a question for the jury whether L. was able to distinguish the smoke from the mist and overhanging clouds.<sup>19</sup>

<sup>1</sup> Larimore v. C. & A., 2 Mo. App. Rep., 1209.

<sup>2</sup> Wabash v. Howard 57 Ill. App., 66.

<sup>3</sup> Severe v. St. L. & S. F., 38 S. W. Rep., 652.

<sup>4</sup> I. C. v. Carter, 62 Ill. App., 618.

<sup>5</sup> G. & N. v. C. G. W., 2 Mo. App. Rep., 1288.

<sup>6</sup> T. & O. C. v. Wickenden, 11 Ohio Cir. Ct. R., 378.

<sup>7</sup> L. & N. v. Tenn. Brewing Co., 23 S. W. Rep., 392.

<sup>8</sup> C. L. St. L. & C. v. McLain, 44 N. E. Rep., 305.

<sup>9</sup> Nurse v. St. L. & S. F., 61 Mo. App., 67.

<sup>10</sup> Gavigan v. L. S. & M. S., 67 N. W. Rep., 1997.

<sup>11</sup> T. & S. F. v. Penfold 45 Pac. Rep., 574.

<sup>12</sup> Boyd v. Harris, 35 Ill. Rep., 222.

<sup>13</sup> Clay v. C. B. & Q., 56 Ill. App., 235.

<sup>14</sup> I. C. v. Orr, 59 Ill. App., 260.

<sup>15</sup> Ill. C. v. Swisher, 61 Ill. App., 611.

<sup>16</sup> C. B. & Q. v. Eggman, 59 Ill. App., 680.

<sup>17</sup> G. H. & S. A. v. Sweeney, 36 S. W. Rep., 800.

<sup>18</sup> I. C. St. v. Pummill, 58 Ill. App., 83.

<sup>19</sup> Lortz v. N. Y. C. & H. R., 40 N. Y. S., 253.

#### MEETINGS AND ANNOUNCEMENTS.

##### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

*Boston & Albany*, quarterly, 2 per cent., payable March 31.

*Buffalo Railway*, quarterly, 1 per cent., payable March 15.

*Chicago & Eastern Illinois*, quarterly, 1½ per cent. on preferred stock, payable April 1.

*Cleveland, Cincinnati, Chicago & St. Louis*, quarterly, 1½ per cent. on preferred stock, payable April 1.

*Hartford & Connecticut Western*, 1 per cent., payable March 1.

*Keokuk & Western*, 1 per cent., payable April 1.

*Little Miami*, quarterly, 2 per cent., on guaranteed stock, payable March 10.

*Manhattan Railway Co.*, quarterly, 1 per cent., also semi-annual 2 per cent., both payable April 1.

*New York & Harlem*, 2 per cent. on common and preferred stock, payable April 1.

##### Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

*Chicago & Alton*, annual, Chicago, Ill., April 5.

*Cleveland, Akron & Columbus*, annual, Cleveland, O., March 18.

*Joliet & Chicago*, annual, Chicago, Ill., April 5.

*Pittsburgh, Cincinnati, Chicago & St. Louis*, annual, Pen Avenue and Tenth street, Pittsburgh, Pa., April 13.

##### Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Street Railway Accountants' Association* will meet to organize in Cleveland, O., March 23 and 24, 1897. For further particulars see issue of Feb. 12, page 121.

The *American Railway Association* will hold its convention at Richmond, Va., on April 7, 1897.

The *National Convention of Railroad Commissioners* will be held at St. Louis, Mo., on May 11, 1897.

The *Association of Railroad Claim Agents* will hold their next meeting at the Southern Hotel, St. Louis, May 26, 1897.

The *Association of American Railway Accounting Officers* will hold a convention at Richmond, Va., on May 26, 1897.

The *Association of Railway Claim Agents* will hold its convention at St. Louis, Mo., during the last week of May, 1897.

The *Master Car Builders' Association* will hold its annual convention at Old Point Comfort, Va., beginning June 8, 1897.

The *American Railway Master Mechanics' Association* will hold its annual convention at Old Point Comfort, Va., beginning June 15, 1897.

The *National Association of Local Freight Agents' Associations* will hold a convention at Washington, D. C., on June 8, 1897.

The *Association of Railway Telegraph Superintendents* will hold a convention at Niagara Falls, N. Y., on June 16, 1897.

The *National Association of Car Service Managers* will hold a convention at Boston, Mass., on June 16, 1897.

The *Train Dispatchers' Association of America* will hold a convention at Detroit, Mich., on June 22, 1897.

The *Railway Signaling Club* will meet on the second Tuesday of the months of January, March, May, September and November, in Chicago.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p. m.

The *New York Railroad Club* meets at 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Tuesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *North-West Railway Club* meets on the first Tuesday after the second Monday in each month, at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.

The *Northwestern Track and Bridge Association*

meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets in its rooms on the first Wednesday of each month, at 8 p. m., to hear reports, and for the reading and discussion of papers. The headquarters of the Society are at 1736-1739 Monadnock Block, Chicago.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m., except during July and August.

The *Denver Society of Civil Engineers* meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the room of the Literary Club, No. 25 East Eighth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m. Address P. O. Box 333.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m.

The *Western Foundrymen's Association* meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. S. T. Johnston, Monadnock Block, Chicago, is secretary.

The *Engineers' Club of Columbus, (O.)*, meets at 12½ North High street, on the first and third Saturdays from September to June.

The *Engineers' and Architects' Association of Southern California* meets each third Wednesday of the month in the Hall of the Chamber of Commerce, Los Angeles, Cal.

The *Engineers' Society of Western New York* holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

The *Civil Engineers' Society of St. Paul*, meets on the first Monday of each month, except June, July, August and September.

The *Engineers' Society of Western New York* meets on the first Monday of each month at the Society's rooms in the Buffalo Library.

The *Boston Society of Civil Engineers* meets at 715 Tremont Temple, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets at 410 Penn avenue, Pittsburgh, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds its formal meetings on the third Wednesday of each month from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

##### The Railway Signaling Club.

The Railway Signaling Club held a regular meeting on Tuesday evening, March 9 at the Great Northern Hotel, Chicago. Mr. H. M. Sperry, of the National Switch and Signal Company, read a paper on "Some Signal Problems."

##### New England Railroad Club.

At the meeting held Feb. 9 the subject "Is it Economy to Use Compressed Air in Painting Railway Equipment?" was discussed at some length. Communications were received from many who have had practical experience in spraying paint on railroad cars by means of compressed air, and the subject was considered in all its phases. A full report will be given next week.

##### Western Foundrymen's Association.

The next meeting of the Western Foundrymen's Association will take place at the Great Northern Hotel, Chicago, Wednesday evening, March 17. The following papers will be read and discussed: "Phosphor Bronze," by Mr. Max W. Wickhorst; "Steel Cones," by Mr. George L. Roby. The committee on "Apprentices" will present a supplementary report at this meeting.

##### St. Louis Railway Club.

A regular meeting of the St. Louis Railway Club will be held in the Southern Hotel on March 12, at 3 p. m. A paper will be read by C. B. Adams, Car Service Agent Wabash Railroad at St. Louis, on "The Advancement of American Railways in the Past 25 Years." A paper will also be read by W. G. Taylor, Chief Clerk, Motive Power Department, Cleveland, Cincinnati, Chicago & St. Louis Railroad, at Indianapolis, Ind., on "Motive Power Accounting."

##### Civil Engineers' Society of St. Paul.

A regular meeting of the Civil Engineers' Society of St. Paul was held on March 1. Mr. Crosby read a short paper on "A Device for raising Cars up the Selby Avenue Hill." Mr. Crosby proposed to install, under ground, at the crest of the hill, an electric motor to run a cable in a conduit from which a grappling apparatus should project upward through a slot. This was illustrated by a working model. It was stated that the cost would be from \$20,000 to \$30,000, depending on the permanence of the work.

##### Western Society of Engineers.

A meeting of the Western Society of Engineers was held Wednesday evening, March 3, at the Technical Club, Chicago. Mr. E. E. Johnson presented a paper on "Deep Well Pumping." Written discussions were read by Messrs. T. T. Johnston, James F. Lewis, A. F. Nagle and Charles L. Harrison. Messrs. J. W. Mead, C. C. Stowell and Charles W. Melcher also took part in the discussion. The paper treated of the economy of old-fashioned deep well pumps, and the application of compressed air as used by the Poble Air Lift. A new deep well pump invented by the author of the paper was also described.



**Central Railway Club.**

A regular meeting of the Central Railway Club will be held on March 12, at the Hotel Iroquois, Buffalo, at 2 p. m., and will be preceded at 10 a. m. by a meeting of the Executive Committee. Reports will be made on the following subject: "Brick Arches in Locomotive Fire-boxes;" Committee, F. B. Griffith, George Hazelton, E. P. Mooney, A. E. Mitchell, George W. West. "Piece Work in Car Repairs;" Committee, H. C. McCarty, Thomas Anderson, John S. Lentz, J. R. Pietrie, Robert Gunn. Non-debatable paper on "Electricity;" F. B. Griffith. "Memorial to the Late Willard G. Taber;" Committee, P. E. Garrison, Amos Gould, J. N. Weaver. The following subjects will be discussed: "Apprentice Boys in Machine Shops." "As inconvenience is experienced in practice, is it necessary to apply repair cards indicating repairs made upon cars in transit, in view of the fact that such repairs are sometimes made by trainmen and others who have not the facilities to make such application? What exception, if any, should be made to the rule covering this question?"

**Engineers' Club of St. Louis.**

The 450th meeting of the club was held at 1600 Lucas place, St. Louis, Mo., Wednesday evening, March 3. A paper by Thos. B. McMath on "The Design of the Edgebrook Bridge" was read. The Edgebrook bridge carries the tracks of the St. Louis & Meramec River Electric Railway over the Missouri Pacific tracks and River Des Peres at Edgebrook, St. Louis County, Mo. Its entire length is 900 ft., and it contains two spans of 135 ft. each. This bridge is typical of a new class, intermediate between the highway bridge and the steam railroad bridge. The writer discussed the main points in the specifications, the principal features in the design, the loads for which the bridge was calculated, and the methods employed in letting the contract. After the reading of the paper a number of lantern slides showing views taken during the construction were exhibited. An interesting discussion followed, participated in by Messrs. Crosby, Barth, Ockerson and Borden. Prof. J. H. Kinealey exhibited a glass model illustrating the working of the Poble air lift pump. He showed the method of operating the pump and explained several theories in regard to its action.

**The Engineers' Club of Philadelphia.**

A business meeting of the club was held March 6, 1897. The paper was on "The Sewage Disposal Plant at Altoona, Pa.," illustrated by lantern slides by Mr. Harvey Linton. At the meeting of Feb. 20, President Joseph T. Richards was in the chair; 79 members and visitors present. The paper was on "Steel as Viewed by the Engineer," by Mr. P. Kreuzpointner, who illustrated his remarks with a series of specimens of steel and a number of diagrams.

He offered three propositions for discussion and consideration:

First. What kind of steel does the engineer want?  
Second. In what condition should the steel be for maximum usefulness?

Third. What are the most approved means and methods to determine the proper quality of a given grade of steel intended for a given purpose?

The speaker called attention to a common fallacy that seems to be growing among engineers, in requiring greater elongation in harder materials, and stated that we cannot expect the high strength of the harder steel and the greater ductility of the softer steel to go together. The most important thing that the engineer wants is a sufficiently high elastic limit to guard his structure from being strained beyond it at any time. The evil effects of blow-holes, oxides and foreign matter in steel are too well known to need more than passing mention.

Although we have as yet no tangible measure for the relative difference in hardness of the crystalline and amorphous parts of the steel, we know that the predominance of one or the other has a good deal to do with the behavior of steel. The hardness and number of the crystals determine the strength of steel, and if the hardness of the matrix approaches that of the crystals without assuming their character, we have a satisfactory metal with good ductility. If both crystals and matrix are too hard, we have a brittle metal that may show up all right in tensile and bending tests, but will nevertheless give bad service because of its liability to cracking. If the crystals are very small and hard, and the matrix middling hard, we have a metal of superior quality and serviceableness. Probably a good many cases of so-called mysterious failures are due to the internal stresses remaining in the steel from improper treatment. There is, unfortunately, no means to detect these stresses in finished material before it goes into service, but an experienced person can see by the way steel is treated in the mill or shop whether internal stresses will be developed.

Mr. Kreuzpointner stated that the engineer deceives himself when he bases his calculations of tensile strength on that fictitious value, the elastic limit as obtained by the drop of the beam, and explained his assertion by a full consideration of the physical behavior of the molecules in a specimen under test.

In regard to elongation as a measure of quality, there seems to be universal agreement at present that it is a more reliable guide to determine ductility than is contraction of area. A piece of steel stretched uniformly over the whole section indicates uniformity of structure, which is a very important quality to the engineer. Drop tests are valuable for steel whenever the intended structure is to be subjected to sudden intermittent shocks.

**PERSONAL.**

—Mr. W. J. Herbert, Contracting Agent of the Baltimore & Ohio, has resigned.

—Mr. Murat Masterson was recently elected Vice-President of the Raleigh & Western.

—Mr. A. C. Tummy, Assistant General Freight Agent of the Louisville, New Albany & Chicago, has resigned.

—Mr. C. R. Davidson has been appointed Secretary of the Joint Passenger Association of St. Paul and Minneapolis.

—Mr. F. B. Ross has been appointed General Agent of the St. Paul & Duluth, at Duluth, to succeed Mr. C. M. Vance, deceased.

—Mr. Aaron W. Lee, Assistant Engineer of the Maryland Division of the Pennsylvania, died on March 7 at his home in Philadelphia.

—Mr. J. L. Word is now Traveling Passenger Agent for the Chicago, Burlington & Quincy, with office in the Equitable Building, Atlanta, Ga.

—Mr. George H. Earl, formerly Assistant Secretary of the Northern Pacific, has been elected Treasurer of that road, to succeed Mr. A. E. Little, resigned.

—Mr. Sherman S. Jewett, who has been a director of the New York Central & Hudson River Railroad since 1884, died at his home in Buffalo, N. Y., on Feb. 28.

—Mr. A. D. Mackay has been appointed temporary Treasurer of the Manitoba & Northwestern, of Canada, to fill the vacancy caused by the resignation of Mr. D. B. Hanna.

—Mr. C. E. Wags, formerly General Freight Agent of the Baltimore & Ohio at Baltimore, has been made Assistant to Mr. C. S. Wight, Manager of Freight Traffic of the company.

—Mr. Edwin Fitzgerald, formerly Assistant General Freight Agent of the Southern, has been appointed General Western Freight Agent of the company, with office as before, at Louisville, Ky.

—Mr. R. D. Yoakum, formerly Traveling Freight Agent of the Gulf, Colorado & Santa Fe, has been appointed General Freight Agent of the Houston, East & West Texas, with headquarters at Houston, Tex.

—Mr. W. W. Hall has been appointed Commercial Agent of the Chicago, Milwaukee & St. Paul, in charge of the Pittsburgh District, with headquarters in Pittsburgh, Pa., to succeed Mr. H. C. Dimock, deceased.

—Mr. J. F. Trowbridge has been appointed General Freight and Passenger Agent of the Columbia & Puget Sound, the Port Townsend Southern and the Seattle & Northern railroads to succeed Mr. E. W. Clark, transferred.

—Major Daniel Thompson died on March 8 in the Middletown (N. Y.) State Hospital. Major Thompson was President of the Middletown & Crawford Railroad until 1881, when a controlling interest in the road was obtained by the Erie.

—Mr. John A. Henderson, Vice-President and General Counsel of the Florida Central & Peninsular, has received an ad interim appointment as United States Senator from Florida, to succeed Hon. Wilkinson Call, whose term expired March 4.

—Mr. Andrew E. Foyé, C. E., of the firm of Foster & Foyé, civil engineers, 52 Broadway, N. Y., has been appointed Chief Engineer of the Interstate Contracting & Construction Co. This company has a contract for building a railroad in the South.

—Dr. D. H. Abbott, of Pamlico County, N. C., has been appointed a State Railroad Commissioner by the North Carolina Legislature to succeed Eugene C. Beddingfield. The other members of the Board are Messrs. J. W. Wilson and S. Otho Wilson.

—Mr. George J. Hartman, who recently left the Atchison, Topeka & Santa Fe to go to the Mexican Central, has been appointed Superintendent of the Chihuahua Division of the latter road, with headquarters at Ciudad Jurez, succeeding Mr. F. T. Dolan, resigned.

—Mr. Thomas A. Price, Assistant General Freight Agent of the Wisconsin Central and President of the National Association of Railway Contracting Freight Agents, died on March 7 in Elkton, Md. Mr. Price had been Assistant General Freight Agent of the Wisconsin Central since 1893, and previous to that time was General Freight Agent of the Sioux City & Northern.

—The President of the Russian State Railroad Administration, P. P. Vassilevski, was shot in his office in St. Petersburg, Dec. 17 last by an Armenian employee of the Trans-Caucasian Railroad, who had come to St. Petersburg to prosecute some claim before the administration, and fancied that his case had been delayed by Vassilevski. The spine was injured and after suffering for a month the victim died Jan. 18. He had been in railroad service since 1862 and had occupied his last position since 1893. He was 56 years of age. His assailant killed himself immediately after shooting Vassilevski.

**ELECTIONS AND APPOINTMENTS.**

**Alabama Great Southern.**—The offices of General Superintendent, Chief Engineer, Superintendent of Motive Power, General Roadmaster and Superintendent of Bridges and Buildings having been abolished, the Master Mechanic, Roadmaster and Supervisor of Bridges will report to and receive their instructions from the Superintendent, who will report to the Assistant General Superintendent.

**Augusta Southern.**—This road having been recently leased by the South Carolina & Georgia, the following officers have been appointed: E. S. Bowen, General Manager; L. A. Emerson, Traffic Manager; F. A. Hegly, Auditor; W. S. Jones, General Superintendent, and J. H. Green, Superintendent of Motive Power.

**Bloomington & Sullivan.**—D. W. Campbell has been appointed Superintendent and will assume the duties of F. M. Leader, General Manager, resigned. The office of General Manager has been abolished.

**Buffalo, St. Mary's & Southwestern.**—The officers of this road, which is a consolidation of the Buffalo & St. Mary's and the St. Mary's & Southwestern roads, as noted in our issue of Feb. 12, are: B. F. Hall, President; J. K. P. Hall, Vice-President and Secretary; G. C. Simons, Treasurer; Andrew Kaul, General Manager; E. Ford, General Superintendent; B. E. Cartwright, General Freight and Passenger Agent; L. P. Snyder, Auditor and Car Accountant.

**Chesapeake & Ohio.**—W. O. Sydnor has been appointed Commercial Agent (freight department), with headquarters at Staunton, Va.

**Chicago Great Western.**—T. M. Smith has been appointed Traveling Freight Agent, with office at 115 Adams street, Chicago, Ill.

**Chicago, Milwaukee & St. Paul.**—W. W. Hall has been appointed Commercial Agent in charge of the Pittsburgh District, with headquarters at room 505, Lewis Block, Pittsburgh, Pa., to succeed H. C. Dimock, deceased.

**Columbus, Hocking Valley & Toledo.**—Receiver Monarrat has appointed W. A. Mills Traffic Manager, in charge of both freight and passenger traffic. The appointment took effect March 1. The office of General Manager, formerly held by Mr. Mills, has been discontinued under the receivership.

**Georgia & Alabama.**—E. C. Lucas has recently been appointed Car Accountant to succeed J. E. Lowry. F. H. McGee has been appointed Master Mechanic, to succeed J. E. Worswick, resigned.

**Grand Rapids & Indiana.**—At the annual meeting of stockholders on March 3 the present Board of Directors was re-elected. The office of Telegraph Superintendent has been created, A. M. Shroyer being appointed to that office.

**Greenwood, Anderson & Western.**—The officers of this road, which recently went into the hands of a Receiver, as noted in our issue of Feb. 5, now are: Channing N. Ward, Receiver; Mike Brown, General Freight and Passenger Agent; L. J. Walker, Cashier; Thomas B. Lee, General Superintendent and Chief Engineer; J. M. Easterling, Auditor, and J. A. Walker, Car Accountant.

**Gulf, Colorado & Santa Fe.**—At the annual meeting of stockholders held in Galveston, Tex., on March 2, the present officers and Board of Directors were re-elected.

**Houston, East & West Texas.**—J. B. Keeper has been appointed Acting Superintendent to succeed Thomas Cronin, General Superintendent, resigned. R. D. Yoakum has been appointed General Freight Agent. Milton Everett, formerly Chief Clerk of the General Freight and Passenger Department, has been appointed Assistant General Passenger Agent, with headquarters at Houston, Tex. J. L. Walsh has been appointed Roadmaster to succeed John Grogan, resigned.

**Kansas City & Northern Connecting.**—The officers of this road, the Northern extension of the Kansas City, Pittsburgh & Gulf, and which recently acquired the Kansas City & Atlantic road, as stated in our issue of Jan. 15, are as follows: President, A. E. Stilwell; First Vice-President, F. A. Hornbeck; Second Vice-President, J. J. Cairnes; Third Vice-President, J. McD. Trimble; Secretary and Treasurer, C. A. Braley; Chief Engineer, Robert Gilham; Superintendent, W. E. Hanson; Auditor, C. A. Peabody; General Freight Agent, John A. Sargent; General Passenger Agent, H. C. Orr.

**Kansas City Northwestern.**—At the annual meeting of stockholders held on March 2 at Kansas City, Kan., the present Board of Directors was re-elected.

**Louisville & Nashville.**—W. P. Thornton was recently appointed Traveling Freight Agent for the territory in Kentucky, with headquarters at Louisville. B. P. Williams has been appointed Contracting Agent at Louisville to succeed J. J. Dignan, promoted.

**Midland Terminal.**—At a meeting of the stockholders on March 1 the following officers and directors were elected: President, D. R. C. Brown; Vice-President and General Manager, W. K. Gillett; Secretary and Auditor, L. R. Ford; General Counsel, H. M. Blackmer; Directors, D. R. C. Brown, W. K. Gillett, L. R. Ford, H. M. Blackmer and B. P. Cheney.

**Northern Pacific.**—At a recent meeting of the Board of Directors, George H. Earl, formerly Assistant Secretary, was elected Treasurer to succeed A. E. Little, resigned, with headquarters in New York City.

**Oregon Short Line.**—The following appointments have been made: E. E. Calvin, General Superintendent and Superintendent of Telegraph; S. W. Eccles, General Traffic Manager; D. E. Burley, General Passenger and Ticket Agent; H. C. Swortwood, General Baggage Agent; J. C. O'Melveny, Chief Engineer; J. F. Dunn, Superintendent of Motive Power; E. J. Fisher, General Claim Agent; Ira O. Rhodes, General Purchasing Agent; W. D. Lincoln, General Car Accountant; J. B. Evans, General Tax Agent; J. M. Bennett, Superintendent Bridges and Buildings; F. W. Hills, Auditor; A. J. Van Kuran, Local Treasurer at Salt Lake City.

**Queen Anne's.**—C. C. Waller has been appointed General Freight and Passenger Agent of this new railroad, the headquarters of which are at Baltimore, Md.

**St. Louis Southwestern.**—W. H. Weeks has been appointed Live Stock Agent to succeed J. W. Barbee, deceased. H. J. Bailey has been appointed Passenger and Ticket Agent at Memphis, Tenn.

**San Antonio & Gulf Shore.**—George Dullnig is now General Manager for Oscar Bergstrom, Trustee for the purchasers of the company's property, succeeding Henry Terrell, resigned.

**South Carolina & Georgia.**—James W. Jackson has been appointed Assistant to the General Manager. Appointment took effect March 1.

**Southern.**—Henry S. Jackson, formerly General Agent of the company at Chattanooga, Tenn., has been transferred to Atlanta, Ga., as Commercial Agent, where he will have charge of the Western territory. L. L. McCleskey, who has been General Agent at Atlanta, is now Commercial Agent in charge of the Northern and Eastern territory, with headquarters at Atlanta.

**Wadley & Mt. Vernon.**—G. A. Croft was recently elected Vice-President and Contracting Agent, with headquarters in Atlanta, Ga.

**West Shore.**—H. Parry is now General Agent of the Passenger Department at Buffalo, succeeding Edson J. Weeks, resigned. H. A. Thomas succeeds Mr. Parry as City Passenger and Ticket Agent at Buffalo.

**White & Black River Valley.**—John T. Flynn has been appointed General Superintendent, to succeed R. B. Fowler, resigned, with headquarters at Newport, Ark.

**RAILROAD CONSTRUCTION,  
Incorporations, Surveys, Etc.**

**Albany, Lebanon, Sodaville & Waterloo.**—This road is projected from Albany, Ore., southeast 21 miles to Waterloo, via Lebanon, all in Linn County. The seven miles of the road between Lebanon and Waterloo have already been graded and locating surveys are now being made from Albany to Lebanon. The road passes through a level country and there is no difficult construction work. It is proposed to do a general freight and passenger business.

**Ashland & Worcester.**—The certificate of incorporation of the Millersburgh, Jeromeville & Greenwich Railroad Company has been amended to provide for a change of its name to the above and also for a change of the termini. The line was originally intended to run from a point on the Cleveland, Worcester & Muskingum Valley road in Wayne County, O., to Greenwich station, Huron County, on the Baltimore & Ohio. The line as now proposed will run through Erie, Huron, Ashland, Wayne, Stark, Tuscarawas and Belmont counties, with termini at Sandusky and Bellaire.

**Atikokan Iron Range.**—Application will be made at the next session of the Dominion Parliament to revive the act incorporating this road in Western Ontario. The road is designed to run from a point on the Canadian Pacific, west of Lake Superior, to the Atikokan iron ore fields north of Minnesota. Very rich iron ore deposits have been found there, and the cost of mining will be low. It is expected the grant will probably be revived.

**Canadian Roads.**—Representing a company seeking



**incorporation, F. H. Chrysler, of Ottawa, is applying to the Dominion Parliament for a charter to build a road from a point on the south boundary line of British Columbia, between the 134th and 136th degrees of longitude, at the head of Lynn Canal, or at some point nearly due north, thence northerly and westerly by the most feasible route to Fort Selkirk.**

**Candon Lane Room & Lumber Co.**—This company, operating at Harton, W. Va., has built six miles of railroad during the past year, and has under consideration the building of 15 miles more during 1897. The road is primarily for the use of the company in hauling logs and timber, but is also open for a limited amount of general traffic. It connects with the Dry Park Railroad at Harton, and is standard gage.

**Cheat River.**—This company, which proposes building a road from the Baltimore & Ohio at Rawlesburg, W. Va., along the bank of the Cheat River to Fairchance, Pa., and thence to a Pittsburgh, Pa., connection, has secured from the County Commissioners of Preston County, W. Va., a right of way over six miles of county road from Rawlesburg to The Ferry, and has completed the surveys over that distance. A force of men is at work grading and distributing ties and rails, and it is expected to complete that part of the road in a few months. The section now being built is designed to open a field of coal and timber that is now inaccessible.

**East Tennessee & Western North Carolina.**—Four miles of the extension of this road from Cranberry, N. C., southeast to Linville, have been graded, and it is expected that grading will be completed over the entire line of 14 miles by June 1. The work is being done by Copening Brothers, of Chicago. The route is expected to develop a considerable white-pine section through which it will run. The road now extends from Johnson City, Tenn., southeast 34 miles to Cranberry.

**El Paso Southern.**—This company was incorporated at El Paso, Tex., on March 7, with a capital stock of \$200,000. The purpose of the company is to build the El Paso terminals of the Rio Grande, Sierra Madre & Pacific, and to build the bridge across the Rio Grande from Ciudad Juarez, which was provided for in a bill which passed Congress last month. The Rio Grande, Sierra Madre & Pacific is now being built from Ciudad Juarez, in a general southwesterly direction, through Corralitos to a point near Casas Grandes, about 156 miles.

**Hutchinson & Southern.**—The extension from Cameron, Kan., the southern terminus of the road, southeast to Medford, O. T., was completed on March 2. Connection was made at Medford with the tracks of the Chicago, Rock Island & Pacific. Local reports state that the company intends shortly to build a branch from Wichita, Kan., south 65 miles, to connect with the main line at Medford. It is also reported that the road will be ultimately extended from Medford south, across Oklahoma and Indian territories, to Denison, Tex., about 375 miles.

**Kansas City, Pittsburgh & Gulf.**—Tracklaying between Mena, Ark., and Horatio, Ark., 50 miles, was completed on March 2. The completion of this work, which was begun in the latter part of last year, makes a through line from Kansas City to Shreveport, La., 559 miles. The objective point of the extension is Port Arthur, Tex. South of Shreveport the line has been completed to Many, La., 68 miles. Of the remaining 100 miles between Many and Port Arthur 65 miles have been graded. This southern portion of the road has lately been temporarily neglected to bring the line into Shreveport as quickly as possible. It is expected that the entire line will be completed to Port Arthur and train service begun by May 1.

**Mexican National.**—Locating surveys are now being made for the extension of the Patzcuaro branch from Patzcuaro, west 28 miles to Ornacon, and it is expected that grading will be begun within a few days. The new line will give an outlet for a rich coffee and mining district. All construction work will be done by the company.

**Mexico, Cuernavaca & Pacific.**—The construction force on the extension of this road to Cuernavaca, Mex., has recently been increased, and there are now about 5,000 men at work on the gap still open between Los Amigos and Tras Marias. It is expected that the line will be completed through Cuernavaca shortly. It is proposed, as soon as this portion of the work has been finished, to place the entire force of men at work to extend the line from Puente de Yxtla to the port of San Blas on the Pacific Coast.

**Norfolk, Virginia Beach & Southern.**—The main line of this road, which extends from Norfolk, Va., east 18 miles to Virginia Beach, is being double-tracked, and it is expected that connection will be made with the tracks of the Norfolk & Western at Norfolk. It is reported that the company is planning a number of improvements, among others to change its Norfolk terminus to Brambleton Ward and to erect a new passenger station at that point.

**Richmond, Petersburg & Carolina.**—The city of Petersburg, Va., has received a proposition from De Witt Smith, of New York, who is represented by Gen. James Negley, of the same city, to purchase its interests in the road. Mr. Smith agrees to organize and capitalize a company and to build a standard-gage road, equipping it with first-class material and facilities for passenger and freight business, and to erect a brick passenger and freight station in Petersburg. He further agrees to issue to the city of Petersburg first mortgage bonds of the company amounting to \$100,000 par value. The road was chartered some years ago to run from Richmond, Va., to Ridgeway, N. C., on the Seaboard & Roanoke Railroad. About 20 miles of the line have been graded just out of Petersburg, and piers for a bridge have been built in the Roanoke River in North Carolina. At a meeting of the Chamber of Commerce of Petersburg, held on March 9, Mr. Smith's proposition was accepted.

**Scalp Level.**—The incorporation of this company was referred to in these columns in our last issue. The road will be built by the Berwind-White Coal Mining Company, which owns a large tract of coal lands in the vicinity of Scalp Level, Somerset County, Pa., to develop these lands. Construction has already been begun and the line will be pushed to an early completion. It will extend from Scalp Level northeast seven miles to Lovett, Cambria County, where connection will be made with the South Fork Branch of the Pennsylvania.

**Truckee & Lake Tahoe.**—This company has recently been incorporated in California to build a road 17 miles long from Truckee, Nevada County, southeast to a point on the north shore of Lake Tahoe, near Tahoe City. The capital stock is \$208,000. The incorporators are: D. L. Bliss and W. D. Toby, of Carson City, Nev.; M. L. Requa and I. L. Requa, of Oakland, Cal., and W. S. Bliss, of San Francisco.

**Washington, Westminster & Gettysburg.**—A certificate of incorporation of this company has been filed for record in the Executive Department at Annapolis, Md. The company proposes to build a road through Montgomery, Howard, Frederick and Carroll counties, with a lateral branch from Sandy Springs or Laytonsville to Frederick, all in Maryland. The capital stock of the company is \$100,000. The incorporators are: William B. Thomas, James A. C. Bond, Charles T. Reifsnider, T. H. Shriver, John A. Shorb, George Smith, James B. Colegrove, John H. Cunningham, David Cowan, Jr., Stewart Roberts, John F. Reifsnider, Milton Shaffer and Edwin J. Lawyer.

**West Virginia Northern.**—Vice-President and General Manager Martin, who has recently made an eastern trip for the purpose of disposing of bonds to raise money for extending this road, formerly the Tunnelton, Kingwood & Fairchance, from Kingwood to Morgantown, W. Va., states that he has made satisfactory arrangements and that the extension will be begun within a few weeks, and will probably be completed during the coming summer. Morgantown is about 20 miles northwest of Kingwood, and surveys of the line have been made. A part of the distance was graded 15 years ago. Most of the right of way has been obtained, much of it having been given free. This new extension will pass through a rich coal and timber country. The road now extends from Tunnelton north 10 miles to Kingwood.

**Yankton, Norfolk & Southwestern.**—The citizens of Norfolk, Neb., have voted \$25,000 to aid in building this road on condition that it is completed by Jan. 1, 1898. The proposed route is from Yankton, S. Dak., south about 60 miles to Norfolk. The company was formed and the line started in 1893, at which time about 20 miles of track was reported as laid. Since that time financial difficulties have caused the suspension of work. Surveyors have been at work along the line for some time past, and it is reported that right of way is now being obtained. It is expected that the line will be built this year.

#### Electric Railroad Construction.

**Asheville, N. C.**—The North Carolina Legislature has incorporated a new electric railroad company, to build and operate a line for both passenger and freight service. It is understood that the work of construction of tracks and power-house will begin during the present spring months.

**Baltimore, Md.**—Mayor Hooper has signed the ordinance authorizing the Falls Road Electric Railroad Co. to extend its tracks on Lafayette avenue, from Maryland avenue to Charles street, and also on certain streets in Woodberry.

**Brockton, Mass.**—The Board of Aldermen received a petition at its meeting March 1, from the Brockton & East Bridgewater Street Railway Co., asking for a location on Plain street, from Montello to the East Bridge water line. A hearing will be held March 23.

**Bowling Green.**—The work of building that part of the Toledo, Bowling Green & Fremont Road which is in Bowling Green was begun last week.

**Charlotte, N. C.**—The Charlotte Electric Railway Co. will extend its tracks beyond a manufacturing suburb known as "Dilworth" to the new racetrack park, recently laid out and to be used this season for the first time.

**Coxsackie, N. Y.**—The Green County Traction Co. has been granted a franchise to operate an electric railroad, five miles long, from Coxsackie to a point three miles beyond the village line; capital, \$50,000. Directors, E. J. Duggan, H. E. Stern, W. E. Drisland, E. J. B. Murray, M. F. Cantwell and Edward J. McCaffrey, of Albany; Matthew J. Duggan, of Greenbush; W. G. Raines, of New York, and G. C. Spencer, of Chicago.

**Dayton, O.**—The Dayton & Western Traction Co. has been incorporated by C. L. Kurtz, Dr. J. E. Lowes, R. M. Nevin, O. G. Sheppard and J. T. Feight, to build an electric road from Dayton west to the state line. Capital stock, \$400,000.

**Detroit, Mich.**—The *Detroit Free Press* states that work on the new Detroit River & St. Clair electric road will be begun at once, and the necessary supplies are being sent to New Baltimore, which will be the headquarters of the construction company. It is expected that 500 men will be actively engaged by March 15, and the roadbed will probably be finished in 60 days, though the line will not be in active operation until July 1. Creditors will be paid within the next 15 days, and labor claims, which amount to about \$7,000, will receive first consideration.

**Dover, Del.**—The time required for the completion of the line by the Henlopen Electric Light & Railway Co. has been extended from 1897 to 1900.

**Doylestown, Pa.**—The Bucks County Trolley Co. has completed its plans and specifications for the power house and car barns. The executive offices of the company will be located in Doylestown and the power house will be located at Little Neshaminy. The company has made its first payment on the land acquired for this purpose.

**Farmingdale, L. I., N. Y.**—It is reported that those who have been interested in the road to connect certain villages in the neighborhood of Farmingdale, L. I., have secured the necessary capital, and that the work will be undertaken at an early date. The proposed line is to extend from Oyster Bay through Glen Cove, East Norwich, Jericho, Hicksville, Central Park, Babylon, Farmingdale and Amityville, and will be about ten miles in length.

**Frederick, Md.**—The Washington, Westminster & Gettysburg Electric Railway Co. has been incorporated with a capital stock of \$100,000. The road is to extend through the counties of Montgomery, Howard, Carroll and Frederick, Md., and have a branch from Sandy Springs to Frederick. Among the incorporators are: Milton Shaffer, Wm. B. Thomas, John F. Reifsnider and James A. Bond.

**Hartford, Conn.**—The petition of the Newington Tramway Co. for permission to build a road connecting the Central Railway & Electric Co., of New Britain, with lines of the Hartford Street Railroad has been granted by Judge Hall, and the construction of the line will be commenced immediately. The New England Railroad Co. withdrew its objection.

**Kent, O.**—John P. Cowing and Valentine Morris, Cleveland, O., have applied for a franchise on East Main street, in Kent. The present plan is to connect Kent, Ravenna and Lake Brady.

**Milwaukee, Wis.**—Articles of incorporation have been filed by the North Greenfield & Waukesha Electric Railway Co., with a capital stock of \$100,000, to build an

electric line from North Greenfield to Waukesha. S. I. Henderson, who is at the head of the new company, says the right of way has been secured, and that they have abundance of capital with which to build the road. The company expects to have the line in operation in time to take advantage of the travel during the coming summer.

**Ottawa, Can.**—Abern & Soper, of Ottawa, have been awarded the contract for supplying the electrical apparatus for the Montreal Park & Island Railway. No. 38-B and 12-A Westinghouse motors will be used.

**Pittsburgh, Pa.**—Notice of the extension of the Pittsburgh & Mt. Washington Electric Street Railway was filed at Harrisburg March 2. The new line will run from the Water Street Bridge over the Monongahela to Republic street via Water and Grant streets, Seventh, Liberty and Grand View avenues, and north Grant and Oneida streets.

**Plainfield, N. J.**—At the meeting of the Bound Brook Borough Council, held March 1, the ordinance was passed giving the New York & Philadelphia Traction Co. the right to lay tracks through a section of the borough.

**Portland, Me.**—The Portland & Yarmouth Electric Railway Co. has been granted permission to cross Martin's Point bridge, and will begin making the changes on the bridge the middle of the week. The Directors of the Portland & Yarmouth Railroad have organized, with Quincy Brown, of Boston, as President, and W. G. Whelden, of Boston, Treasurer. These two gentlemen and F. C. Boyd, of New Haven, constitute the Board of Directors.

**Pottstown, Pa.**—The Ringing Rocks Electric Railway Co., of Pottstown, Pa., has been granted a right of way by the Town Council of Boyertown. The company proposes to extend its lines from Ringing Rocks Park to New Hanover, and thence to Boyertown, this spring.

**Raleigh, N. C.**—Charles Johnson, Manager of the Raleigh Electric Co., states that it has been decided to rebuild the power-house to operate the electric street cars, and electric lighting plants. The railroad plant was burned over two months ago, as noted at the time, and as it had not made any money during its three or four years of operation, the directors at first decided not to rebuild. Subsequently they agreed to rebuild if a sufficient number of patrons would engage electric lights of the same company in order that they might operate a combined plant. The sufficient number of customers were secured last week.

**Reading, Pa.**—At a meeting of the stockholders of the Reading & Boyertown Electric Street Railway Co., the following officers and directors were elected for the ensuing year: President, Jeremiah Hageman; Secretary, M. G. Taylor; Treasurer, Dr. F. J. B. Rhoads. Directors: Dr. T. J. B. Rhoads, M. G. Taylor, C. B. Spatz, J. Hageman and F. P. Esterly. The road, starting from the tracks of the P. & R. Railroad at Boyertown and connecting with the East Reading road at Black Bear, will be built this spring. The capital stock is \$300,000, divided into \$100 shares.

**Richmond, Va.**—The Richmond Railway & Electric Co. is preparing to extend its Barton Heights line to Lakeside Park, as contemplated some time ago.

**St. Louis.**—Mr. J. B. C. Lucas, of the Wellston, Creve Cœur & St. Charles Electric Railway, which was incorporated about a year ago, states that application has been made to the St. Louis County Court for a franchise to operate the line. Action will soon be taken in the matter.

**Shamokin, Pa.**—A press report states that the Shamokin-Mt. Carmel Electric Railway Co. will extend its lines down the mountain from Centralia to Ashland during the summer. This extension will be two miles in length and will connect with the line of the Schuylkill Traction Co. at Ashland, thus completing a continuous electric line from Shamokin to Shenandoah, Mahoney City and East Mahoney Junction, a distance of nearly 30 miles.

**Sherbrooke, Que.**—Mr. Burke, President of the Sherbrooke Electric Railway Co., states that the work will be commenced early in the spring and completed before August.

**Tiffin, O.**—Press reports state that Samuel B. Sneath, owner of the uncompleted Tiffin & Fostoria electric railroad, has decided to continue the work on the road. A greater part of the 14 miles between this city and Fostoria has been graded and over a portion of the distance the rails have been laid.

**White Plains, N. Y.**—The trustees have granted a franchise to the White Plains and Elmsford trolley line to construct a branch of its road along Lexington avenue and the Post road.

**Wilkes-Barre, Pa.**—The Wyoming Traction Company will make several extensive improvements on some of its lines this spring, the most important of which will be on the Nanticoke branch. The company proposes to double track the road in several places.

**Winsted, Conn.**—Formal permission was granted on March 8 by Judge Fenn to the petitioners for an electric road from Winsted to Torrington. No one opposed the charter on the part of the steam railroad, and it was held that public convenience warranted its construction. This line parallels the Naugatuck Division of the New York New Haven & Hartford.

#### GENERAL RAILROAD NEWS.

**Boston & Lowell.**—The Massachusetts Board of Railroad Commissioners has approved an issue of \$200,000 4 percent, 20 year coupon or registered bonds by this road, for the purpose of paying, retiring and funding the Lowell & Lawrence 6 per cent, bonds, which mature on Oct. 1 next.

**Central of New Jersey.**—The earnings for January were as follows:

	1897.	1896.	Inc. or Dec.
Gross earn.....	\$855,215	\$1,009,507	D. \$154,332
Oper. expen and taxes....	599,997	658,997	D. 59,000
Net earn.....	\$255,217	\$350,509	D. \$95,352

**Chesapeake & Ohio.**—Earnings for January and for the seven months ending Jan. 31 were:

	1897.	1896.	Inc. or Dec.
January: Gross earn.....	\$918,248	\$940,124	D. \$21,876
Oper. expen.....	621,901	665,512	D. 43,611
Net earn.....	\$296,347	\$274,612	I. \$21,737



Seven months:		
Gross earn.....	\$6,276,779	\$6,144,591
Oper. expen.....	4,169,762	4,146,960
Net earn.....	\$2,107,017	\$1,997,631

**Chicago, Burlington & Quincy.**—The earnings for January were:

1897.		
Gross earn.....	\$2,672,628	\$2,593,604
Oper. expen.....	1,664,983	1,800,280
Net earn (def.).....	\$1,007,645	(def.) \$787,323

**Chicago & Eastern Illinois.**—A warranty deed in favor of this company, and executed by the Chicago, Paducah & Memphis, has been filed at Mount Vernon, Ill. The deed conveys to the company all the property, corporate rights and franchise of the Chicago, Paducah & Memphis, between the cities of Altamont, Effingham County and Marion, Williamson County. The consideration is \$1,400,000. There was filed at the same time a release deed executed by John D. West, President of the St. Louis Trust Co., in satisfaction of a \$5,000,000 mortgage given by the Chicago, Paducah & Memphis to the Trust Company, July 2, 1894. These two instruments will be filed for record in the counties of Fayette, Effingham, Marion, Jefferson, Franklin, Williamson, Johnson and Massac.

**Columbus, Hocking Valley & Toledo.**—On March 9 the Circuit Court at Columbus, O., dismissed the suit of the stockholders against Judge Stephenson Burke and his associates. The suit was brought in consequence of alleged mismanagement of Judge Burke in bonding the property for \$8,000,000, very little of which amount, it was claimed, was ever used in the proposed improvements of the road. This was the second suit against Judge Burke and was brought in the name of the Central Trust Co., of New York, which claims some interest in the bonds.

**Detroit, Grand Rapids & Western.**—Charles Merriam, Treasurer of this road, formerly the Detroit, Lansing & Northern, has issued a circular to the bondholders, stating that expensive delays, legal and otherwise, have so retarded the reorganization of the system that it has proved impossible to form a new company prior to Jan. 1, 1897, and that the reorganization committee have deemed it wise to so far modify the plan as to have the new bonds dated Jan. 1, 1897, and the first coupon for three months' interest payable April 1, 1897. The distribution of the new securities of the company under the reorganization plan of Feb. 1, 1896, is as follows: For each \$1,000 Detroit, Lansing & Northern 7 per cent. bond with all overdue coupons, 4 per cent., first consolidated mortgage bond and scrip amounting to \$829.72, 5 per cent. preferred stock amounting to \$835.50 and cash from division of sinking fund, \$8.31; for each \$1,000 Grand Rapids, Lansing & Detroit 5 per cent. bond with all overdue coupons, 4 per cent. first mortgage bond and scrip amounting to \$750 and 5 per cent. preferred stock amounting to \$51.67; for each \$1,000 Saginaw & Western 6 per cent. bond with all overdue coupons, 4 per cent. first consolidated mortgage bond and scrip amounting to \$750 and 5 per cent. preferred stock amounting to \$510; for each \$1,000 Saginaw Valley & St. Louis 8 per cent. bond with all overdue coupons, and for each \$1,000 of Saginaw & Grand Rapids 8 per cent. stock, 4 per cent. first consolidated mortgage bond and scrip amounting to \$750 and 5 per cent. preferred stock amounting to \$483.33.

**Evansville & Richmond.**—Operations on this road have been entirely suspended until March 23 when the road is to be sold. The suspension was a direct result of the heavy damages suffered by the road from the floods of the past few days. The loss amounts to about \$250,000 and in view of the approaching sale the management will not attempt to make repairs. The road was chartered Sept. 10, 1888, to extend from Elmore to Richmond, Ind., 175 miles of which 101.4 miles, between Elmore and Westport, were built.

**Illinois Central.**—Earnings for January and for the seven months ending Jan. 31 were:

January:		
Gross earn.....	\$1,919,805	\$1,920,639
Oper. expen.....	1,187,153	1,289,160
Net earn.....	\$722,652	\$631,479
Seven months:		
Gross earn.....	\$13,361,793	\$13,519,424
Oper. expen.....	9,219,494	8,711,719
Net earn.....	\$4,142,299	\$4,807,705

**Lehigh Valley.**—The announcement was made last Tuesday afternoon that Messrs. Drexel & Co., of Philadelphia, have arranged with the trustees of the Packer estate to fund the entire indebtedness of that estate, and in connection with this transaction Drexel & Co. are to have the voting power on all the Lehigh Valley Railroad stock controlled by the estate, which is said to amount to \$2,500,000. It is announced further that the Lehigh Valley Railroad Co. has contracted with this firm for a general readjustment of its finances. An agreement has been made to create a series of \$8,000,000 of 5 per cent. bonds. Bonds to the amount of \$5,000,000 are to be issued now and have been sold to Drexel & Co. Three million dollars may be issued as needed in the next two or three years, and the company reserves the right to increase the amount of the mortgage after 1899 by \$1,000,000 annually for seven years. The bonds now sold are expected to pay the entire floating debt and to leave a substantial working capital.

**Missouri Pacific.**—Earnings for the year ending Dec. 31 have been reported as follows:

1896.		
Gross earn.....	\$22,011,960	\$22,672,004
Oper. expen.....	16,491,324	17,021,140
Net earn.....	\$5,520,636	\$5,650,864
P. c. expen. to gross.....	74%	75
Total income.....	\$6,052,128	\$6,732,715
Charges.....	7,314,889	7,332,992
Deficit.....	\$1,262,761	\$600,247

**Norfolk & Western.**—Earnings for January and for the four months ending Jan. 31 were:

January:		
Gross earn.....	\$882,070	\$875,583
Oper. expen.....	613,352	740,909
Net earn.....	\$268,718	\$234,674
Four months:		
Gross earn.....	\$3,672,045	\$3,780,532
Oper. expen.....	2,630,980	2,938,283
Net earn.....	\$1,041,065	\$842,249

**North Carolina.**—The bill providing for a change in the lease of this road to the Southern, making the term of the lease 36 years instead of 99 years, the term of the present lease, which passed the State Senate on Feb. 26, was brought up in the House of Representatives on March 8 and after a considerable discussion it was de-

cided to place it on the table. On March 9 at Lynchburg, Va., Judge Simonton granted the necessary papers for a rule against the director of the company to show cause why an injunction should not be issued against any attempt to break the present lease of that road to the Southern. The rule was made returnable on April 6 at Greensboro, N. C. The usual order of restriction forbidding any change in the status of the road before that time was also ordered.

**Northern Pacific.**—The earnings for January have been reported as follows:

1897.		
Gross earn.....	\$958,867	\$1,163,922
Oper. expen.....	821,597	837,825
Net earn.....	\$137,270	\$326,097
Taxes.....	36,500	41,388
Balance.....	\$100,770	\$284,709
Other income.....	25,991	60,317
Total.....	\$126,761	\$345,026

The operations of the St. Paul & Northern Pacific are included in 1897.

**Peoria, Decatur & Evansville.**—A decree of foreclosure of the second mortgage bonds was issued on March 3 by Judge Allen in the United States Circuit Court at Springfield, Ill., ordering that the road be sold. The decree was issued on a cross bill of the Central Trust Company, of New York, and William A. Heilman, trustees. There is a mortgage for \$1,287,000 on the line extending from Pekin to Mattoon and one for \$1,470,000 on the line from Mattoon to Evansville. The date of sale of the road has not been announced.

**Philadelphia & Reading.**—The earnings for January and for the year to date were as follows:

January:		
Gross receipts.....	\$1,538,427	\$1,787,116
Oper. expen.....	887,834	1,020,948
Profit in operating.....	\$650,593	\$766,168
Improvements and renewals.....	39,882	67,664
Surplus.....	\$610,711	\$698,504
Year to date:		
Gross receipts.....	\$3,315,872	\$3,680,725
Oper. expen.....	1,810,690	2,078,971
Profit in operating.....	\$1,505,212	\$1,601,751
Improvements and renewals.....	120,121	139,293
Surplus.....	\$1,385,091	\$1,462,458

The gross earnings of the Coal and Iron Co. were \$1,694,066 in January, and there was a deficit in mining of \$134,258, against a profit of \$23,341 in 1896.

An arrangement has been made with Messrs. Drexel & Co. to extend the improvement mortgage bonds which were issued in 1873 and mature Oct. 1 next. These bonds are secured by a mortgage next after the Consols of 1871 and are in coupon form for \$10.00 each. These bonds will be extended for a period of 50 years from April 1 next, with interest at the rate of four per cent., payable semi-annually in gold. The lien of the mortgage now securing these bonds will continue unimpaired, and the Reading Company (the owner of the capital stock of the railroad company) will become responsible for the payment of both principal and interest.

**Raleigh & Gaston.**—Arrangements have been completed for the refunding of \$1,000,000 of the 8 per cent. first mortgage bonds of the company which fall due on Jan. 1, 1898. A trust mortgage of \$1,500,000 from the company to the Mercantile Trust & Deposit Co. of Baltimore has been recorded in North Carolina, said mortgage to pay 5 per cent. interest. The mortgage is to secure an issue of a like amount of 50-year 5 per cent. gold first mortgage bonds due 1947. It is the intention to use \$200,000 of bonds for betterments and improvements on the line and \$300,000 for additional construction. The fixed charges of the company will be reduced by this arrangement from \$80,000 to \$60,000 per annum. Last year the net earnings of the road were \$242,000, and they have averaged for the last six years over \$200,000.

**St. Louis, Iron Mountain & Southern.**—Arrangements have been made with Messrs. Vermilye & Co., and Kuhn, Loeb & Co., to extend the first and second mortgage bonds issued by the company and maturing on May 1 next, the principal to be payable in 50 years from that date and interest on May 1 and Nov. 1 in each year. The first mortgage bonds, which amount to \$4,000,000 and now pay 5 per cent., will be extended at 4½ per cent. and the second mortgage bonds, which amount to \$6,000,000 and now pay 7 per cent., will be extended at 5 per cent. per annum. The company reserves the right to pay off at any time either or both issues of extended bonds at 105 per cent. and accrued interest, upon giving six months' notice of such intention. The Cairo, Arkansas & Texas first mortgage 7 per cent. bonds, which amount to \$1,450,000 and mature June 1 next, will be paid on that date.

**Southern Pacific.**—The earnings of the whole system for December, and for the year ending Dec. 31, were as follows:

December:		
Gross earn.....	\$4,314,260	\$4,368,873
Oper. expen.....	2,736,335	2,577,139
Net earn.....	\$1,577,925	\$1,791,734
Year:		
Gross earn.....	\$48,656,419	\$50,457,022
Oper. expen.....	31,961,916	33,242,398
Net earn.....	\$16,694,503	\$17,214,624

**Texas, Sabine Valley & Northwestern.**—This road was sold at Longview, Tex., on March 2 to Messrs. F. T. Rembert, D. D. Durham, and G. T. Merrill, of Longview, and the Grigsby Construction Co., of Jefferson, Tex. The amount paid was \$8,000. No bids were made by any of the Eastern owners of the road nor by their representatives. The road is 40 miles long, extending from Longview to Boren, Tex.

**Utah Central.**—A decree of foreclosure was ordered on March 4 by Judge Hiles at Salt Lake City, Utah, against this road. It is held that the Receiver's certificates to the sum of \$100,000 and interest are a first lien on the company's property, and interest is allowed on \$24,000 of such certificates held by Bamberger & McMillen, to the amount of \$1,630. As soon as a decree has been drawn and filed in accordance with the decision, Judge Hiles will appoint a Special Master to sell the road.

#### Electric Railroad News.

**Baltimore, Md.**—The City Passenger Railway Co. has issued \$500,000 of certificates of indebtedness.

**Chicago.**—Hallgarten & Co., of New York, have taken the additional \$2,500,000 of the consolidated bonds of the West Chicago Street Railroad Co.

**Dover, N. H.**—The Union Street Railway Co., recently purchased by New York parties, has been reorganized under the name of the Union Electric Railroad, with the following officers: President, Sumner Wallace; Rochester, N. Y.; Secretary, L. P. Snow, Rochester; Treasurer, Harry Hough, Dover.

**Doylestown, Pa.**—The bond of the Bucks County Trolley Co. for \$5,000, demanded by Willow Grove Turnpike Co. as security for the fulfillment of the terms of the lease recently executed by the two corporations, has been filed at Doylestown.

**Fitchburg, Mass.**—The Railroad Commissioners have granted to the Fitchburg & Leominster Railway Co. permission to issue \$150,000 5 per cent. 30 year bonds, of which \$120,000 will be used for funding the debt incurred in extending the road and \$30,000 for refunding other bonds due Oct. 1, 1909.

**Indianapolis, Ind.**—The Court has denied the application for a Receiver for the Citizen's Street Railway Co.

**Lincoln, Ill.**—William H. Tranter has been appointed Receiver of the Lincoln Electric Street Railway Co.

**Philadelphia, Pa.**—The power-house at Thirteenth and Mount Vernon streets, from which the Union Traction Co. operated about six of its lines, was destroyed by fire on March 3. The loss is about \$500,000, principally on the machinery in the building. The power-house was a large brick structure, covering a third of the block, and contained eight Westinghouse dynamos and other valuable machinery. The accident appears to have been caused by carelessness in using a crane, the chain of which made a short circuit in one of the large generators and caused the sparks to set fire to the floor. A horse was frightened by the escaping steam of the boiler and two persons were killed.

**St. Louis.**—Mr. Chas. Green has been appointed Permanent Receiver of the People's Railroad Co.

**San Antonio, Tex.**—The Alamo Heights Street Railway went into the hands of W. H. Hume as Receiver on Feb. 27. The Franklin Trust Co., of New York, holds the largest share of the bonds.

#### TRAFFIC.

##### Traffic Notes.

The Norfolk & Western announces that freight rates from the Atlantic Seaboard to the West, recently reduced, will be restored on March 18.

The Interstate Commerce Commission will hear the complaint of the New York grain exporters, concerning freight rates from the West, on March 15. The members of the Board of Managers of the Joint Traffic Association have been notified to appear.

The Fort Worth & Denver City road has reduced rates on cattle from Texas to Montana and other Northern grazing regions. This action was taken by resolution of the Board of Directors, indicating that it is contrary to the advice of the managers of the Southwestern Traffic Association.

The managers of the Joint Traffic Association have again postponed the date for the abrogation of commodity rates to June 30, 1897. After April 1 a renewed attempt will be made to remove the innumerable difficulties in the way of carrying out this reform.—The managers have requested the sub-territorial associations to withdraw commodity rates on June 30.—The managers have recommended that flour from the West arriving at New York be stored free 40 days instead of 20 days as at present.

##### Chicago Traffic Matters.

CHICAGO, March 10, 1897.

The Chicago-St. Paul lines appear to have given up trying to get the Joint Traffic Association to join them in meeting the reductions of the "Soo" line. It is now given out that they will issue freight tariffs on west-bound business, meeting the rates of the "Soo" and absorbing the whole reduction north of Chicago, the Joint Traffic Association having agreed to recognize the tariff of the Western lines.

Western roads have reached an agreement as regards the movement of the Young People's Christian Endeavor traffic to San Francisco next July. The rate of \$51 for the round trip is to be maintained, and the routing of the business will be left entirely in the hands of the Chairman of the Western Passenger Association, as previously agreed. Contracts already made which threaten disturbance are to be given to the Chairman to carry out. The rate is too low to make it worth while to fight for the business, being considerably less than a one-way rate. The roads have agreed that they will pay no commission on the business and give no free transportation.

The Illinois Central is causing the other roads of the Western Freight Association some uneasiness. It agreed that temporarily it would allow all of its export business to New Orleans to be subject to the regulations of the associations, but on Thursday it came out that it had had with the Interstate Commerce Commission a rate of 32 cents on lard and other packing-house products from Sioux City to New Orleans, for export. The authorized Association rate is 43 cents. The Kansas City rate has been applied at Sioux City.

Eastbound shipments from Chicago and Chicago Junctions to points at and beyond the Western termini of the trunk lines for the week ending March 4 amounted to 120,397 tons, as compared with 110,567 tons the preceding week. This statement includes 64,093 tons of grain, 11,017 tons of flour and 13,517 tons of provisions, but does not include live stock. The following is the statement in detail:

Roads.	WEEK ENDING MAR. 4.		WEEK ENDING FEB. 25.	
	Tons.	p. c.	Tons.	p. c.
Baltimore & Ohio.....	6,398	5.3	7,454	6.8
C. & C. & St. Louis.....	9,232	7.7	6,740	6.1
Erie.....	10,283	8.5	10,490	9.5
Grand Trunk.....	10,737	8.9	9,238	8.4
L. S. & M. S.....	14,803	12.3	15,303	13.8
Michigan Central.....	14,551	12.1	18,483	16.7
N. Y., Chi. & St. L.....	15,390	16.3	9,589	8.7
Pitts., Chi. & St. Louis.....	10,693	8.9	11,178	10.1
Pitts., Ft. Wayne & Chicago.....	15,422	12.8	14,861	13.4
Wabash.....	8,688	7.2	7,231	6.5
Totals.....	120,397	100.0	110,567	100.0